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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLXVII. No. 3193.] LONDON, JULY 23, 1924. [76TH YEAR. PRICE 1s.

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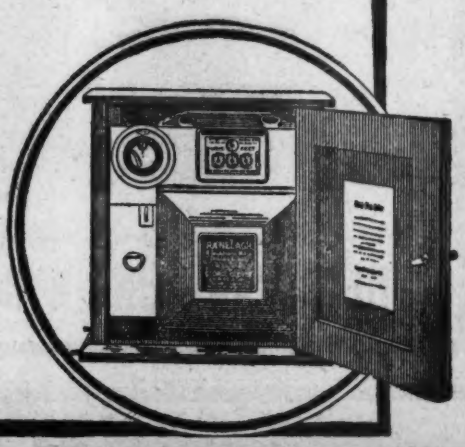

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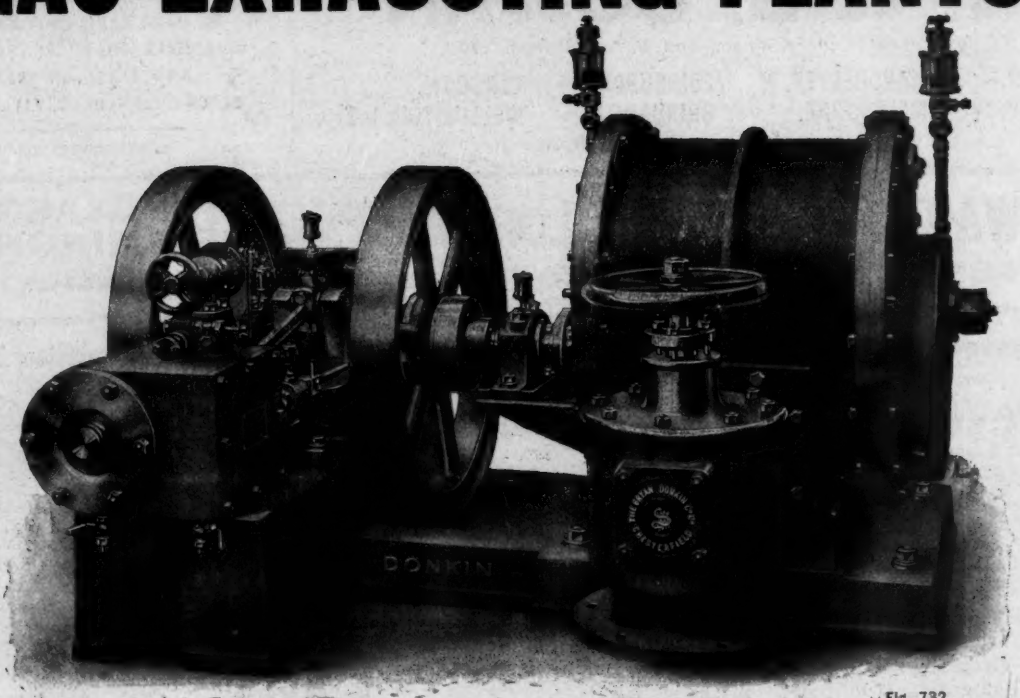

Fig. 732.

Gas Exhauster coupled direct to Horizontal Steam Engine (C Type) combined on the same cast-iron baseplate.

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VOL. CLXVII., No. 3193.] WEDNESDAY, JULY 23, 1924. [76TH YEAR.

EDITORIAL NOTES.

Advertising Advertising.

THE International Advertising Convention held at Wembley last week was a unique event, and an important one. The Convention is of American origin. It is the annual meeting of the Advertising Clubs and Societies of the World, but has never before, in a history of nearly twenty years, met outside the North American Continent. Last year, several members of the Thirty Club of London—the most influential organization of advertising experts in this country—attended the Convention at Atlantic City, and invited the members to hold their meeting this year at Wembley. The invitation was accepted; and for the first time in history, an American founded and conducted organization of business men held their annual meeting in England. Those who attended the gatherings, both business and social, last week know that it is no exaggeration to say that this event is destined to make its mark on the history of the English-speaking peoples. A great many of our visitors have never been in the British Islands before; many of them came with prejudice and misconception in their hearts and minds. They had not been in this country many hours before the welcome they received, the men and women they met, the obvious friendliness and cordiality of the people here towards them, experienced in the historic environment in which they found themselves, had banished prejudices, corrected misconceptions, and established in their hearts a sense of brotherliness towards their colleagues here that will have incalculable value in years to come for the peace of the world.

That this is no fanciful picture may be gathered from a remark made in obvious sincerity by one of the delegates attending the Public Utilities Advertising Section to its English Chairman. "Sir," he said, on the closing day of the Convention, "I learnt to sing 'God Save the King,' with my lips for the first time coming over on the boat. To-day, I can sing it with my heart." And that is a typical, not an isolated, case, on both sides. We in this country also had our prejudices and our misconceptions. Some of us were inclined to expect of our visitors an undue amount of pride, even a good deal of boastfulness, respecting their own land and its customs. Those who were so inclined were very agreeably disappointed. Those who sat through the General Sessions as well as sectional sessions, who met hundreds of our visitors at all kinds of social and religious functions, and made close acquaintance with a number of them, state that never from start to finish did they hear a single word of self-appreciation, far less of boasting, but always the most ungrudging admiration and praise of the old country, its buildings, its scenery, its customs, and its people. If no business profit, in the direct sense, had accrued from this Advertising Convention, it would have been well worth while for its contribution to the better understanding, and thus the better liking, each of the other, of the two great nations in whose hands rests the destiny of modern civilization.

But from the practical business point of view, the Convention fully justified the time, thought, and energy put into its preparation and carrying through. It served to awaken very many of the general public to a realization of the fact that advertising, on modern principles and in modern practice, is a valuable instrument in the commercial life and a potent factor in the industrial prosperity of a nation; that advertising *reduces*, not increases, the selling price, because it reduces the manufacturing and distributing cost of the goods advertised, through increasing demand, turnover, and output; that advertising raises the standard of living, through educating the public as to the conveniences, comforts, and luxuries that are within their reach; and that the bad old days when advertising was chiefly used to foist upon the public indifferent or harmful goods at exorbitant prices, have given way to a time when the large majority of advertisements are based upon truth, are backed by value for money, and have for their aim the creation and maintenance of the goodwill of the satisfied customer.

These truths—and the other important fact that a progressive advertising policy has a marked reaction on the staff of an undertaking, from top to bottom, and creates the desire to live up to the standard of the service advertised—were brought home to the public at the Convention by the presence and the speeches of the Prince of Wales; of Cabinet Ministers, past and present, including men of such eminence as Mr. Winston Churchill, Sir Robert Horne, and Sir Philip Lloyd-Greame; of leaders of industry, such as Lord Leverhulme; and of great newspaper proprietors, such as Lord Burnham and Sir William Berry. These and other speakers informed public opinion upon the fundamental truths respecting advertising as a creative and reforming force. The departmental sessions, for their part, served to stimulate thought and increase knowledge among the delegates themselves, who are engaged in the daily task of planning publicity and organizing salesmanship; and, by bringing together men and women so engaged from all quarters of the globe, making them acquainted, and causing an interchange of ideas that only began at the Convention and will continue in the future, raised the power of usefulness of all of them.

This was certainly felt to be true by everyone who took part in the proceedings of the Public Utility Advertising Section, presided over jointly by Mr. Frank LeRoy Blanchard, of New York, and Mr. F. W. Goodenough. The British Gas Industry is to be congratulated upon the fact that the Executive Chairman of the British Commercial Gas Association was invited by the Convention to organize this Section, and upon its undoubted success. This compliment to the British Commercial Gas Association was deserved by reason of that Association having been, as its genial Manager, Mr. W. M. Mason, said, in the summary he gave of his paper outlining the history and work of the Association, the first organization to undertake co-operative publicity for a public utility; and it was very pleasant to find our electrical friends and the representatives of the great railway industry co-operating cordially and fully with the gas industry in the discussion of matters of common interest. Who knows what may come of such a first "getting together?" The section crystallized their discussions into the following resolution, proposed by Mr. Goodenough, seconded by Mr. Beauchamp, and unanimously adopted:

This Conference is of opinion:

(1) That it is as important to advertise the services which public utilities can render to the community as it is to advertise the goods of firms which have no monopoly rights of supply;

(2) That goodwill, based upon equitable policy and "service-first" principles, is essential to the permanent prosperity and persistent progress of public utility undertakings;

(3) That advertising is essential to the establishment and maintenance of such goodwill;

(4) That fully educated, efficient salesmen are equally essential; and

(5) That the possession of a monopoly, whether by a

company or a municipality, imposes on its administrators the *duty* of a policy of progressive business methods, in the interests of consumers as well as of stockholders or ratepayers.

We commend this resolution to the careful consideration, and fullest consequent action, of every gas undertaking in the country. Its adoption as a basis of policy throughout the industry would be a splendid outcome of the International Advertising Convention of 1924.

Amateurs and Coal Economy and Electrical Energy.

AMONG the repressive influences from which this country has suffered, particularly during recent years, have been the attempts of meddlesome and officious amateurs to direct industries into new ways and methods against the major conviction of those whose lives have been spent in such work. These amateurs are mostly of the political brand; and they have sought to make their nostrums applicable by legislative means. Right on top of the great World Power Conference at Wembley, where fuel experts were gathered, where a large amount of commonsense prevailed, and where the practical sides of matters affecting coal and power and heat production were examined with first-hand knowledge, there comes a book entitled "Coal and Power," the contents of which in comparison are extremely feeble and without substance. The volume purports to be the report of a Committee presided over by Mr. Lloyd George; and it has a preface by that gentleman. The names of the members of the Committee are not divulged; the only name we have is that of the Chairman. Whoever the members were, it is clear to those versed in these matters that they know as much about the problems of power and heat supply, and the parts that electricity can efficiently and inefficiently take in them, as does their Chairman. If "amateur" had been printed in black type on every page of the volume, the hand and brain of the novice would not have been better indicated than they are by what actually appears. There is nothing new in the book. It has all been produced by the visionaries of the past, and reproduced by those of the present, as it will probably be by those yet unborn. But the trouble is that amateurs of the Lloyd Georgian stamp create a public opinion—they instil mistaken ideas into the minds of a public who are just about as incapable of judging of these matters as is the eminent politician; and this does an infinite amount of mischief. Conclusions are drawn from false premises, and so new beliefs are formed, and new hopes fostered. In this way, there is a tendency to break and divert the lines of natural evolution, and so retard true progress.

The volume in the first part is largely a *réchauffé* of things that the Sankey Committee and Mr. Lloyd George have said before as to the methods of recuperating the coal-mining industry; and the second part is extensively founded on features of the Coal Conservation Committee's report (with a good deal of added embroidery) respecting the development of the electricity supply industry, the marvellous savings that would be effected thereby, and the new heaven upon earth that would be created. Just as that report was swallowed by the non-technical Press, so this volume has been swallowed by the Garvins of the daily and weekly Press, and passed on to the public as presenting the one thing needful to the full recovery of the industrial life of this country and an extension of its prosperity, and to the promotion of home comforts at a modicum of present costs. These are not the days of miracles; these are the days when men have to look at the affairs and system of life in a practical, commonsense way. It is futile to spend time in dreaming dreams, and to base upon visions only beliefs as to possible materialization. As we read the volume, we are reminded of the words of one of the foremost of our electrical experts—Sir Alexander Kennedy—at the World's Power Conference: "The possibilities of electricity are so great, "and to many minds so fascinating, that it has proved the "easiest thing—a thing unfortunately only too easy for "enthusiasts, political and other—to issue streams of words "full of beautiful promises of a universal Utopia if only the "supply of electricity were sufficiently 'cheap and abun-"dant,' but with too little consideration of what would be "involved in the 'sufficiently,' before the world was totally "idealised. Enthusiasm is splendid, and indeed is very "necessary if any progress is ever to be made; and possibly "ignorant enthusiasm is occasionally better than none at all. "In any case, the object of a concourse of experts, such as "this conference calls together, is to deal with actual con-"ditions in a commonsense way, and to carry on with an "enthusiasm tempered by scientific knowledge and by a "deep-rooted dislike of that kind of talk which is *vox et* "*præterea nihil*."

We are not much interested in what the political mentor says about the coal-mining industry, and what he and his covert Committee recommend for its salvation. But it is seen that following rather closely the Sankey Committee's report (which has been falsified in the one respect in which it has been tried, that of coal production with reduced hours of employment) the line of advance recommended is by unified ownership and control of the mineral resources of the nation by the purchase of all minerals and royalties by the State, amalgamation and grouping of mines, altering the status of the miner in the industry, concentration on better mines and the progressive development of new mines for old, better housing and the reconstruction of mining village conditions, and the conversion of coal into electricity. The mining industry is interested in the recommendations of its amateur advisers; and mineowners reject the proposals just as forcibly as the miners' leaders have done who have had an opportunity of making pronouncement upon them. They are out for nationalization of the mines—lock, stock, and barrel. Some of the recommendations, though stale, may be all right. But the others are not; and one of them that is not is the idea that the conservation of coal, industrial prosperity, and home life and health will be promoted by concentrating upon the conversion of coal into electricity. There is not an atom of proof in the whole volume that the ends would be achieved by working in this direction. In it there is plenty of the *vox et præterea nihil*. There is an abundance of what other people have said, with much garnishing by a highly accomplished hand. It is proposed that electricity shall be generated in super-power stations, and the old independent stations be gradually discarded; that effort should be directed to encourage private enterprise to establish a national system of electrical generation and distribution; that the State should undertake the work of providing trunk mains in special circumstances; that the new system should be designed so as to encourage the conservation of our fuel resources and the utilization of bye-products, and the development of new industries. But how all this is going to assist in the conservation of our fuel resources is not positively revealed. But it is boldly and categorically asserted that we shall have cheaper power, coal will be saved, waste will be eliminated; and that there will be financial economy, smoke abatement, better and cheaper railway transport, and a revival of industry. Furthermore, great advantages and economies, it is said, will result from the more extended use of electricity in the household for heating, cooking, and cleaning. Now we know, because Mr. Lloyd George and his Committee have spoken. The electrical industry will be profoundly interested and amused. They have heard it all before. Among other points, it is noticed that one great economy would be achieved by the super-power stations using up at the pitheads (the fact that huge volumes of water would be required there for condensing purposes is overlooked) the inferior coal that cannot at present be raised and transported on account of its poor quality; they could consume even the rubbish dumps which exist in the colliery areas. Mr. Lloyd George and his associates know little of how more steam-raising plant and therefore capital expenditure would be required for a given output owing to the reduction of efficiency by the use of "rubbish" of low calorific value and high ash content; and that this reduced efficiency would materially discount the predicted economy.

However, the provision of power and heat the electrical way is proposed as the means of producing a gigantic saving in coal. The saving quoted is that put forward by the Coal Conservation Committee—55 million tons of coal per annum, which at only 10s. per ton would represent £27,500,000—in fact, the Committee calculated a saving of £100,000,000 at least through the provision of power and heat electrically; and this without taking into account the monetary benefits that would accrue to the industries of the country and in domestic life. Mr. Lloyd George and his Committee do not appear to have heard of a report prepared by Sir Dugald Clerk and Professors Smithells and Cobb, which conclusively proved the falsity of the foreshadowed coal economies and savings that could be effected by turning coal into electrical energy for the provision of the

power and heat required by this country. If the whole of the power and heat energy used were produced electrically, the rate of exhaustion of the coal reserves of the country would be greatly accelerated. This is shown by the facts that the average generating station to-day loses 93 p.ct. of the heat units of the coal, and gives in the form of electrical energy only 7 heat units; the more efficient generating stations show a thermal efficiency of only 12 p.ct., and a loss of 88 p.ct.; the super-power stations, a thermal efficiency of 18 p.ct., and a loss of 82 p.ct. The average domestic fireplace using coal does better, with a thermal efficiency of 20 to 24 p.ct.; and the same applies to industry. How can Mr. Lloyd George reconcile these truths with the savings on which so much of this flimsy, word-packed report is based. In the ordinary gas-works process, of the heat units in the coal carbonized, 50 p.ct. are returned to the market as coke, 5 p.ct. as tar, 22·5 p.ct. are expended in manufacture or lost in distribution, and 22·5 p.ct. reach the consumer as gas. Thus 77·5 p.ct. of the heat units in the coal are delivered to the community. If in future complete gasification be practised, it is probable that 75 p.ct. of the heat units in the coal will be available for distribution as gas, as against 18 p.ct. in the form of electrical energy. In the paper by Mr. F. W. Goodenough, at the World Power Conference, in dealing with the Clerk-Smithells-Cobb report, he pointed out that, after allowing (in both cases) for all losses in transmission and utilization, there would be involved in the doing of equal work for the consumer the using-up of 3 tons of coal in the super-station of the future as compared with 1 ton at the gas-works of the future. Said Mr. Goodenough, "to displace by gas the 40 million tons of coal now used for domestic fuel (these are figures deduced from Sir Dugald Clerk's data and the Coal Controller's estimated gas equivalent of coal for fuel purposes), a net destruction of only 30 million tons of coal would be involved if carbonized at the works of to-day; whereas if electrical energy were employed, some 120 million tons would be destroyed at the generating stations of to-day, or 60 million tons at the super-stations if they proved as economical in coal consumption as is promised." We should like Mr. Lloyd George and his associates to consider these figures, and then to try satisfactorily to prove that they do not undermine the substructure of the work they have put into their foolish report. The exercise would do them good; the results of their effort might, if they did not abandon their present position, provide scope for some interesting controversy. It is not likely they would accept a challenge. But they cannot deny that there is a responsibility upon men of the political position of Mr. Lloyd George not to mislead the public; and a further duty (not recognized in this instance) is that he should be sure of his facts before presenting to the public such a case as that contained in the volume.

By such means as these, the public are being deceived—we will not say deliberately, but through the ignorance of such authors. In our opinion, one of the central organizations of the gas industry ought to broadcast a reply through the Press to help to counter the mischief that has been done and will be done by such amateur work.

Deeper in the Mire at Alloa.

IN the autumn of last year, we wrote in condemnatory terms of the position of affairs at Alloa in respect of the huge burden of loss engendered by the electricity undertaking, but placed upon the backs of the gas consumers under that antiquated, inequitable, and vague Electric Lighting (Scotland) Act, 1890. The position was scandalous then; it is more so now. Nothing has been done to alter the conditions. The drift has increased the losses, and so added to their aggregate amount, the liquidation of which can (the Council appear to believe legally, if not morally) be placed upon the gas consumers; and there is the prospect of still further additions! The position is a serious reflection upon what can arise under municipal control of trading undertakings in Scotland; and all right-minded authorities across the Border will deplore this exhibition of bungling, which helps to discredit municipal administration, and to inflict such a grievous load upon the consumers of gas—fully half of which load has to be found by the poor prepayment consumers. In this fact alone there should be enough to bring the colour to the cheeks of the municipal councillors for very shame of their participation in such an act of injustice; for Act or no Act it is unjust.

Really we cannot understand why the Council have allowed capital expenditure to grow on a losing concern to such an extent as it has done since they severed electricity from the gas undertaking. That severance took place, though the tendency of modern times is, in order to effect economy, to run gas and electricity concerns supplying small communities under one management. When the division occurred in 1919, the Convener of the Gas and Electricity Committee (Bailie Hendry) states, the capital debt was £46,759; it has since risen, until at May last it was £139,245. To meet interest and sinking fund, only a little more than ½d. per unit was required in 1920; in 1923, it had risen to 2¾d.; and in 1924 to 3¼d. Viewed in the light of the enormous losses, this outlay seems inexcusable; and the effects are seen not only in charges in excess of those of the Scottish Central Power Company (80 p.ct. of the output of the Alloa concern is for power, and the price, despite the heavy loss, we believe is about 150 p.ct. higher than pre-war), but in the fearful accumulation of losses, which is being shunted on to the gas consumers. It would be interesting to read the best defence the Council could put forward to administration which allows this sort of thing. We find from the published report that on May 15, 1923, the losses had been permitted to heap-up to £32,446. Twelve months ago it was estimated that in the then current financial year, there would be a loss of £3000; the actual loss is £6300, with 16 p.ct. less electricity sold than in the year before. That £6300 makes the loss at May last £38,746; and now it is estimated that this year business will be carried on with an insufficiency in income of £4000. The estimated loss last year was more than doubled; and therefore faith in the £4000 will not be very marked in Alloa. The sums mentioned make roundly £43,000. If this amount is taken out of the pockets of the gas consumers as is proposed, and payment is spread over a period of (say) fifteen years, then at the end of that period the sum so paid, including charges for interest, will amount to £60,200. Bailie Hendry has the power of vivid expression. He says the £60,200 does not exhaust the tragedy of the situation, nor the whole tax upon the gas consumers. In addition, there will be an item of almost £9700 which the Gas Department will be called upon to pay for income-tax on the profits necessary to pay off this huge debt—in all a positive sum to be carried by the gas consumers, through the losses of the Electricity Department, of approximately £70,000. This is reducing municipal administration to a condition which deserves the heartiest derision, while deeply sympathizing with the gas consumers over being the victims of such a persistent descent from right to wrong.

There is no doubt the Council are at length genuinely alarmed over a position which grows worse and worse. One expert has advised the sale of the electricity concern to the Power Company; and now the Council are taking the advice of a firm of accountants. But all the advice in the world will not cause that mountain of loss to vanish, or relieve the gas consumers from paying the losses of the crippled competitor. As it is, the consumers of electricity on the borders of Alloa are getting energy from the Power Company at a lower price than the consumers within the borough; and the gas consumers are paying 7d. per 1000 c.ft. more than they should be doing, and will continue to do in present circumstances, owing to the delinquencies of the electricity concern. What a different financial tale the Gas Department relates for the year. The gross profit was £16,234. Sinking fund and interest charges amounted to £6160, leaving a net profit of £10,124. The net profit would have enabled gas to be sold at 1s. 1d. per 1000 c.ft. less during the year, had it not been for the 7d. per 1000 c.ft. that was charged during the latter six months of the year towards liquidating the electricity losses. We gather from the report that £5000 of the gas profits have been allocated to wiping-off a bit of the electrical loss; and the gas consumers are having a reduction of 3½d. per 1000 c.ft. as from April last. It seems to us that the gas consumers of Alloa are badly in need of a leader to bring the Council to realize that their duty is to hold the balance fairly between the gas consumers and the electricity consumers, and not make the former pay part of the costs incurred in supplying the latter. It is fortunate for Alloa that one of their undertakings is so notably successful. The pity of it is that it might be more so were it not that another undertaking is so notably unsuccessful. We shall await with interest the report of the investigating accountant. His task is not an enviable one; but we think we could forecast one or two points that he will make in his report.

Wembley.

The British Empire Exhibition was three months old yesterday; and up to and including Saturday last 7,585,345 people have passed through the turnstiles.

The Gas Exhibit.

We heartily thank those correspondents who have written to us regarding the Gas Exhibit. The letters shall be dealt with at an early date. The practically unanimous approval is highly gratifying.

Mr. "Punch" Consents.

Following the suggestion by Dr. Carpenter in our "Correspondence" columns last week, we sought and have obtained the permission of the proprietors of our genial contemporary "Punch" to reproduce in our columns [see pp. 384-5] the laughable account of a visit to the Gas Exhibit by a hypochondriacal and hypercritical person, who in the end confesses to being a chimney sweep. *Verb. sap.!*

Copious Publicity.

But not too copious. That cannot be in respect of anything with a great mission in this world of ours—a mission which brightens life and eases labour in all directions, and produces economies direct and indirect which must have an aggregate value of no mean proportions. The Gas Exhibit is something of which we are all proud; but it is the central feature of a big campaign, which requires the expenditure of money apart from it. The issues of this campaign greet us wherever we travel. Never has gas been talked or written about to the same extent that it has been the last few months. The advertising is simply wonderful. It is so far-reaching that it is impossible for any one individual to know what is actually going on. It is seen in the papers that are regularly read; it is seen on hoardings, in railway stations, and on omnibuses. But what the individual reads in his regular papers and sees in his travels from home, is only a small portion of the whole. What is read and seen has its like elsewhere; it has remarkable universality. More can be learned as to this from the June issue of the B.C.G.A. "Bulletin." The great enterprise of the gas industry is going to meet with a substantial reward. Friends in different parts of the country inform us that they are already beginning to feel the development of a demand for gas appliances of various kinds which it is their belief will attain a volume that will be without precedent. The interest and the talk must be maintained. It is costing money to do this; and the subscriptions to the work have not come up to the estimates. There is a shortage of a few thousand pounds. We put two direct questions to each reader of these lines: "Has your undertaking subscribed?" If not, "Will it do so?" A subscription of 6s. per million c.ft. of gas made is not a burden; and this is a co-operative enterprise.

From Hands Across the Seas.

The "Bulletin" tells us that the response of the Dominions to the opportunity given them to subscribe to the Gas Exhibit and its accompanying work is beginning to arrive. Adelaide with £100; Bombay with £50; Melbourne with £250; Sydney with £250; and North Shore, Sydney, with £75—set a magnificent example of "co-operating like brothers for the good of the family" that will be very helpful to gas managers in persuading their Boards and Committees to do their share of co-operating. We are pleased to acknowledge this munificence from the Antipodes and India. From Australia, New Zealand, and India there have been visitors who have passed through the Gas Exhibit; and no doubt there will be many more. We have recently met three laymen from India who are spending a well-earned vacation at home; and their praise of the Gas Exhibit was great.

Smoke Abatement Bill.

This was read a second time in the House of Lords last week; but not before the Government had heard a few home-truths as to the deficiencies of the measure. An announcement was made by Lord Gainford that, when the Bill reaches Committee, he will move an amendment giving the Minister of Health not only power of exclusion from the protection of the Bill, but also power to include processes which require protection—new or already operating processes. He is also going to propose that it shall be obligatory on the part of an inspector to see that notice is at once given to the individual accused of an offence so that there shall be no delay in finding a cure. It seems to Lord Newton that trades which under previous Bills have enjoyed exemption are now going to enjoy still more. In this he traces the hand and influence of Sheffield, which is one of the smokiest of towns in the country. He twitted the Government with their impertinence in exempting their own establishments from the operation of the Bill. His Lordship regards this smoke abatement problem as one of the most pressing social questions of the day. It has also a very important political aspect; for it is not a mere coincidence that the most disturbing influences in politics proceed from the districts most afflicted by smoke.

Electrical Strike Threat.

The electricity supply industry is not having a comfortable time with its workers. They want an advance in wages of 10s. per week; and a ballot shows 7630 votes in favour of strike action to enforce it, as compared with 5112 in favour of arbitration. The figures represent 12,742 workers, while a recent return gives the number of employees in the industry as about 29,000. The dispute involves the whole of the electricity undertakings in the country; and the employers have offered arbitration, which, as seen above, to the extent that the workers voted, has been rejected. A serious aspect of the matter is that some forty unions are involved in the dispute; and these have a membership approximating 200,000. The course of action to be taken is, failing agreement before then, to be determined on July 30.

Unemployment and Contracting-Out.

The Government met with their eighth defeat last Friday—this time on the question of contracting-out in respect of unemployment insurance. In his Unemployment Insurance Bill, the Minister of Labour (Mr. Shaw) proposes that the power to contract-out of national insurance shall cease. The power is at present in suspense, while the insurance fund shows a deficiency. In view of the fact that the deficiency period is likely to last for some years, and there must be revision of unemployment insurance within two years, it is difficult to understand why the question should be prejudged at a time when it cannot arise. An amendment to the Bill was moved on Friday which declared that the power to contract-out should remain in abeyance until a year after the end of the deficiency period. The object of the amendment is to keep the door open, so that schemes of insurance by industry may at least be considered. The Government are accused of wanting to put a definite end to contracting-out, so as to stop individual effort, and have everything on a national basis. Mr. Shaw pictures contracting-out by all the protected trades if an end is not put to it, and national insurance having nothing left but casual labour and industries with a high percentage of unemployment. He would not budge; and so the Government saw the amendment carried by 171 to 149 votes. The prior position is therefore continued.

According to Mr. C. A. Beard, a representative of the New York Bureau of Municipal Research, Tokio, after destruction by earthquake, is being literally re-erected on the framework of its public utilities. The street-car tracks, he said, extending in every direction, were intact. While the ruins were still smouldering the cars began to run. The water and gas pipes and other sub-surface structures remained implanted in the old network of streets. It is on this old framework of gas pipes and street railway tracks that the new City of Tokio is to rise.

Information Bureaux and Special Libraries.—A conference will be held at High Leigh, Hoddesdon, Herts., during the week-end Sept. 5-8, to which are invited all men and women who need to utilize information systematically, or who are interested in the conduct or operation of information bureaux, intelligence services, and special libraries. The programme will include papers and discussions on the functions, future developments, and methods and equipment of intelligence bureaux, and on their relations with other institutions, including national and public libraries. It is hoped to obtain representatives of such varied fields of activity as government and municipal departments, technical and research institutions, industrial concerns, financial houses, insurance offices, newspapers, and civic and social organizations, all of which have a common interest in the collection, treatment, and dissemination of facts and information relevant to their particular activities. Further information may be obtained from Mr. A. F. Kidley, Athenæum Chambers, No. 71, Temple Row, Birmingham.

PERSONAL.

Mr. PERCY GRIFFITH, M.Inst.C.E., F.G.S., is paying a professional visit to Peru—leaving England to-morrow.

Owing to a break down in health, Mr. L. HISLOP is shortly retiring from the position of Engineer and Manager to the Bothwell and Uddingston gas undertaking, which position he has held for nearly 32 years.

Mr. HENRY CURTIS, who for the last four-and-a-half years has been Assistant Gas Engineer to the Macclesfield Corporation Gas Department, has been appointed Gas Manager and Engineer in succession to Mr. F. W. J. Belton, who, as announced recently, has been appointed to a similar position with the Christchurch Gas Company, New Zealand. The appointment is subject to the confirmation of the Town Council, and the salary suggested is £450, rising to £500. Mr. Curtis served his apprenticeship with West's Gas Improvement Company—spending seven years in the drawing office, and subsequently being placed in charge of the erection of plants at Belfast, Bangor (Ireland), Holywood, and elsewhere.

Mr. WALTER CHANEY, late of the City of Birmingham Gas Department, has joined the Board of Sir Charles Bright and Partners, Ltd., Consulting Engineers, of No. 146, Bishopsgate, E.C. 2. Mr. Chaney and Mr. A. Hugh Seabrook, of that firm, are already associated on the technical committee of a finance company which has recently been formed to facilitate the combination of gas and electricity and to utilize the existing organization of the smaller gas undertakings by the addition of an electricity business.

Mr. J. H. BREARLEY, M.Inst.C.E., who is engaged in consulting practice at No. 28, Hawkshead Street, Southport, was appointed Gas Examiner under the Gas Regulation Act, 1920, to the County Borough of Southport, at a Court of Quarter Sessions held in Liverpool on the 15th inst.

OBITUARY.

The death is announced of Mr. C. S. E. GRIFFITHS, of Hoolydene, Pensnett. A magistrate for the County of Stafford, Mr. Griffiths was elected unopposed to the Staffordshire County Council about a fortnight ago. He was a mining engineer, and a Director of the Brierley Hill and Stourbridge Gas Companies.

The Ignition Temperatures of Gaseous Mixtures.

The question of the ignition temperature of gaseous mixtures is one of great importance in connection with the characteristics of inflammable gas-air mixtures, and it is being studied at Manchester by Prof. H. B. Dixon, as well as at Ardeer and at Sheffield. Determinations have been made of the temperatures at which various gases and vapours ignite in oxygen and in the air, both instantaneously and with various "lags." Experiments are proceeding with mixtures of hydrogen and carbon monoxide; and it is proposed to determine in the same way the ignition points of ethylene and other hydrocarbons, and of carbon disulphide and of coal gas. A furnace is also being designed for ignition-point determinations under increased pressure. A mixture of methane and air cannot be ignited immediately by a flame, but there must be an appreciable time contact. The phenomenon is not peculiar to methane, but is well marked with this gas, whereas with hydrogen, for example, it can only be measured with difficulty. The duration of the "lag" decreases as the temperature of the source of heat that causes ignition increases, but, as has been shown, is still appreciable even when the source of ignition is a flame. The duration of the "lag" with different mixtures of methane and air, and with other gases, is being studied at Sheffield by admitting small quantities of the mixtures into an evacuated vessel of quartz heated at different temperatures (up to 1200° C.). The interval between the admission of the mixture and its inflammation can be measured from records of the pressure changes within the vessel. An attempt is being made to obtain relative times of ignition by flames of different temperatures by determining the velocity of uniform movement of flame in such mixtures; the whole apparatus being kept at any required temperature. The screen wire method in conjunction with an Einthoven galvanometer has been tried.

Irish Association of Gas Managers.—It is gratifying to have intimation from the Hon. Secretary and Treasurer (Mr. George Airth, of the Dundalk Gas-Works) that the annual meeting of the Irish Association of Gas Managers is to be revived this year. It is to take place in the Mansion House, Dublin, on Wednesday, August 13, under the Presidency of Mr. W. E. Young, of Queenstown, who will deliver an address. Subsequently, Mr. T. J. Reid, of Ballina, will contribute a paper on "The Position of the Gas Industry in Ireland, with special reference to Electrical Competition"; and cinema films will be shown of Glover-West vertical retorts in operation and under construction. In the evening members will be the guests at dinner of the Queenstown Gas Company, and the following day will be devoted to an attractive excursion. If any member or extraordinary member has not received notice of the meeting, he should communicate with Mr. Airth for particulars.

ELECTRICITY SUPPLY MEMORANDA.

DURING the past three weeks, through the influences of the First World Power Conference and the Advertising Convention at Wembley, there has been a large amount of fraternizing between representative men of the gas and electricity industries, from various quarters at home and different countries abroad.

Co-operation.

Electrical engineers, with gas engineers, were on July 7 the guests at luncheon of the Chairman (Mr. D. Milne Watson) and members of the Gas Exhibit Committee; and on Tuesday last week men from home quarters, America, and elsewhere who are associated with technical papers serving the public utility industries were the guests at luncheon of Mr. F. W. Goodenough, who presided at the afternoon meeting of the Public Utilities Section of the Advertising Convention, at which both gas men and electrical men read papers. In America the gas and electrical men know little of the sharp differences there have been between their compeers in this country, and for the simple reason that "over the way" many gas and electricity concerns are united under one ownership, though in business development there is, as here, the keenest rivalry. Nevertheless, in the States there is a large amount of co-operation and good fellowship between the rivals. All agree that both industries have large parts to play in the world, and that both are indispensable. There is in this country a more pronounced tendency to-day than there was a few years ago to co-operate between the gas and electricity industries; and there is mutual patronage. Many electricity undertakings purchase fuel from the gas industry; and it is not an unknown thing for gas-works to be consumers of current from the town cables, though in most cases the required energy is produced by the gas-works themselves. There is also combination of supply for the convenience of areas where there is economy in running the two services conjointly. In the past, there has been a great deal of inane talk by the short-visioned members of the electricity industry as to co-operation between the two industries being a myth, and so unrealizable in any way whatever. But this is not the view of the leaders of the industry. And of the leaders, the Chairman of the Electricity Commissioners (Sir John Snell) must be counted—may we not say?—the chief.

Views from High Quarters.

At the luncheon first referred to in the preceding paragraph, the Chairman (Mr. Milne Watson) named some of the distinguished guests, including Lord Newton, Mr. John W. Lieb, of the Electricity Department of the Consolidated Gas Company of New York, and Sir John Snell. He mentioned that Mr. Lieb claimed every right to be present at the lunch, as the electricity undertaking with which he is associated is owned by a Gas Company. That (jocularly remarked the Governor of the Gas Light and Coke Company) is just as it ought to be. There was laughter, in which Sir John Snell heartily joined. The Chairman added that electricity uses and lives on other sources of power, and this electrical men should never forget. There is another thing they should never forget; and it is that the gas industry through its products supplies other industries with important raw materials which are essential to their existence, and those industries, in their operations, have considerable recourse to electrical power, which would not be required were it not for the prior work of the gas industry. Then Sir John Snell mentioned that, though following another industry, he felt he was among friends; and the accompanying applause left no reason to doubt that it was so. He soon passed to the question of co-operation. It is true that during the World Power Conference a great deal was heard as to the merits of electricity. One could say much as to the validity of some of those "merits" for all purposes in a country which has to rely mainly upon coal for the generation of electrical energy. But that is not the purpose in view in writing these notes. Sir John would not say anything treasonable regarding those electrical interests which he is bound to stimulate and develop in his official capacity. But as a citizen he cannot forget that there is the great gas industry, and that it is a duty to see that the capital which has been invested in it, and the labour which has been devoted to it, are not lost to the nation. And then from Sir John there came deliberately these words: "It should be borne in mind that in this country, particularly where we are living upon a wasting asset, it is of the greatest importance that there should be the fullest co-operation between gas and its younger sister—the electrical industry. . . . I hope that in the years to come, with the view of conserving the deposits of coal in this country, there may be greater co-operation brought about between this great industry of gas and what I trust and believe may prove to be the great industry of electricity supply." Further, "I look forward to the time when these two industries will not be regarded as rival factions; but when, in the national interests, there shall be brought together into counsel, for the best development of the resources of the country, the combined brains and intelligence of both." Those are the words of a true engineer—one with constructive aspirations, and not one who prefers that the two industries should live exclusively apart without any regard to the fortunes of the country as a whole. Small in comparison are the words of the scribes in certain electrical papers, who take no heed of the expanding position of the gas industry, and idly

look for its demise rather than for co-operation with it. After Sir John Snell came Sir Dugald Clerk, who is all for co-operation, but not of an official character at present. He prefers that any co-operation should be unofficial, as he believes in individualism. Mr. Lieb, too, says that in the United States it is felt that the two industries can go together, having both as their ideal the rendering of a necessary public service. In the development of the two industries in the State of New York, the electricity department proceeds hand in hand with the gas department. There is, of course, intensive rivalry, to the benefit of both, as it keeps each keyed up. Yet with all this, there are electrical myopes.

Co-operation Advocated and Developing.

Whether or not those myopes like it, co-operation is developing in the conservation of the coal reserves of the country. The use of gas coke by electricity undertakings has attained a position from which it cannot be dislodged. Where it is employed, it is found that it promotes steam-raising efficiency, through the remarkably improved condition of the fuel bed, which is a direct gain to electricity apart from the indirect one of subscribing to national economy. But it is hoped the men of the electricity industry will not think we are saying this because the gas industry has surplus coke for sale. As a matter of fact, at the present time, it has not. Last year, the industry exported no less than 1¼ million tons of coke; but it would have been better in the national economy had that coke been retained and used in this country for steam-raising. Indeed, in current circumstances, it matters little to the gas industry—save from the national point of view—in which market it disposes of its coke. But it should matter to the electricity undertakings that they employ fuels, and on a system, which will improve the efficiency of their steam-raising plant. In Mr. E. W. L. Nicol's paper at the World Power Conference, he gave two tests—one of a boiler fired by coal and coke on the "Sandwich" system, and the other by coal only. The calorific value of the coal and coke per lb. was 11,138 B.Th.U.; of the coal only 12,150 B.Th.U. Yet the fuel consumed per grate-foot hour was with the former 30·66 lbs. as compared with 31·66 lbs. with the latter; the water evaporated per hour with the former was 10,505 lbs., and with the latter 8747 lbs; per square foot of heating surface it was 5·22 lbs., as compared with 4·35 lbs.; the water evaporated per lb. of fuel as fired from feed temperature was 7·18 lbs., as against 5·76 lbs.; the water evaporated from and at 212° Fahr. was 9·22 lbs., as compared with 7·44 lbs. The efficiency of the boiler and superheater with coal and coke was 69·9 p.ct., and with coal alone 53·12 p.ct.; while with economizer, the efficiency was 79·96 p.ct., as compared with 60·98 p.ct. Do not these figures suggest to electrical engineers some ground on which there could be co-operation in the interests of the electricity industry, which uses a good many pounds of fuel per annum, and evaporates a good many pounds of water? Sir Arthur Duckham also, in his paper, pointed to the great waste that is taking place through the want of co-ordination in the provision of our power supplies, and among other things urged that as much of the raw fuel as is economically possible should be treated by gas undertakings to recover the valuable bye-products. Mr. W. Gordon Adam, B.A., likewise in a paper, called attention to the liquid products of coal carbonization as sources of power; and Dr. E. W. Smith showed how by co-ordination, better organization of fuel supply, and more efficient means of utilization, a radical and economical improvement could be effected in industry, in health, and human happiness. If these papers are read by the men of the electrical industry, they will agree that, to adopt a *non possumus* attitude in this matter of co-operation, is altogether untenable.

The Follies of Excessive Enthusiasm.

We hope the men of the electricity industry, or at any rate those who entertain exaggerated notions through an unjustified hyper-enthusiasm, will peruse and ponder over the opening passages of the paper read at the World Power Conference by Sir Alexander B. W. Kennedy, who is one of the greatest of our electrical authorities. We are all agreed that the possibilities of electricity are great, and to many minds fascinating. Owing to this, Sir Alexander says, it has proved the easiest thing—a thing unfortunately only too easy for enthusiasts, political and other—to issue streams of words full of beautiful promises of a universal Utopia, if only the supply of electricity were sufficiently "cheap and abundant," with but too little consideration of what would be involved in the "sufficiently" before the world was totally idealized. There is much meaning underlying those words. There must come a point at which with any electricity supply concern the average pence received per KW.-hour cannot be further reduced if outgoings and income are to balance, and something remain as profit. And there must be a point at which this country can no longer afford for heating purposes to expend (even in the best of operating circumstances) 25,000 to 30,000 B Th.U., for the purpose of obtaining only about one-ninth of those B.Th.U., or about 11 p.ct., in the form of electrical energy, and there are few cases in which such an efficiency is realizable at present. However, Sir Alexander also says truly when he remarks that enthusiasm is splendid, and indeed very necessary, if any progress is to be made, and possibly ignorant enthusiasm is occasionally better than none at all. He added, in any case, "the object of a concourse of experts, such as this conference calls together, is to deal with actual conditions in a commonsense way, and to carry on with an enthusiasm, tempered by scientific knowledge, and by a deep-rooted dislike of that kind of talk which is *vox et præterea nihil*. It has been greatly to the disadvantage of the electricity industry that so many of its men have not dealt with actualities in a commonsense way, and have not tempered their enthusiasm by scientific knowledge, and their advocacy by something better than mere sound. It is the belief of Sir Alexander that there will be a great extension of demand for domestic "industrial" purposes. But it has to be recognized that these have great seasonal variation. He indicates his view that the manufacturing industries, with their forty-eight hour load a week, is the direction in which the industry must chiefly look. There is much that is wise in what is said by Sir Alexander; but there are not a few who will feel that he has given them a nasty, but well-deserved, rap over the knuckles.

Yorkshire Electric Power Bill.

This Bill has excited a large amount of attention; but a House of Lords Committee have decided that, as framed, it should not proceed. The Committee had heard that the Company and its sister Distribution Company had been highly successful. They also knew that the promoters had been to Parliament within the last five years no fewer than three times. This Bill was largely consequent on an Order or scheme that the Electricity Commissioners made last year. It was explained to the Committee by Sir John Snell that a settlement had been arrived at between the parties after negotiations lasting over four years. The powers of the Electricity Commissioners, however, were limited; and it was impossible to give effect to the settlement without this supplementary Bill. But there was strong opposition to it by the Corporations of Sheffield and Rotherham, who alleged that the Bill represented a complete alteration of the law in regard to the supply of electricity. The measure, it was contended, was piecemeal legislation in its most objectionable form. They also believed it would be utterly destructive of the scheme for the North-East Midlands area in which they were interested. Brighouse and other authorities submitted that the scheme gave the Company a monopoly in a large area; and a number of small authorities pleaded with the Committee to give them protection. As stated above, the Committee declined to allow the Bill to proceed. The Electricity Commissioners do not appear to be making much headway with their electricity generating co-ordination and concentration strategy.

Ownership.

As we have recently pointed out, the local authorities of the country are viewing with some alarm the operation of the process of co-ordinating electricity generation, which is placing in the hands of the power companies so much of the work of electricity production. The "Electrical Review" calls attention to the annual report of the Committee of the Association of Burgh Officials of Scotland, in which there is reference to what is described as the attempt now being made by limited liability companies to obtain the control of electricity undertakings. They view this with concern. In the past, they say, local authorities, in the public interest, and at enormous cost, have acquired tramway undertakings, gas-works, and water undertakings after these had been established by private companies. Such undertakings, since they came into the hands of local authorities, have been successfully developed, and the requirements of the districts fully met. These requirements can be further augmented as needed by a combination of local authorities. "The financial benefits that have accrued through the successful handling of all such undertakings by local authorities have passed to the citizens instead of going into the pockets of shareholders." It would, the Committee think, be a retrograde step if electricity undertakings were allowed to pass from the control of local authorities.

"Miners' Wages and the Cost of Coal."—We have received from the Director of the Institute of Economics, No. 26, Jackson Place, Washington, a book bearing the above title and published by the M'Graw-Hill Book Company, Inc., No. 370, Seventh Avenue, New York, and Nos. 6 and 8, Bouverie Street, London, E.C. 4. Written by Isador Lubin, it is a study of the wages system in the bituminous coal industry and its effect on coal cost and coal conservation.

Pacific Coast Gas Association.—By securing permanent headquarters in the Wells Fargo Building, San Francisco, the Pacific Coast Gas Association has marked another step in its growth and, simultaneously, the growth of the gas industry on the Pacific Coast. The Association has risen from a small beginning some thirty years ago, until now, in its thirty-first year, its membership stands at 843 and comprises all the different phases of the gas industry, not only the public utilities and manufacturing companies, but also the appliance men and dealers. The increasing work of the Association in late years has brought about the inauguration of a permanent working organization, and the establishment of central headquarters is the first step in this direction. Another new departure for the Association is the appointment of a permanent Assistant Secretary, who will be installed at headquarters, and will give all his time and attention to the business of the Association. This post has been given to Mr. Clifford Johnstone, a gas man from the South, who is well qualified for the work.

HIGH-PRESSURE LIGHTING IN PARIS.

Contributed, by request, by
G. RECLUS, Ingénieur, Société du Gaz de Paris.

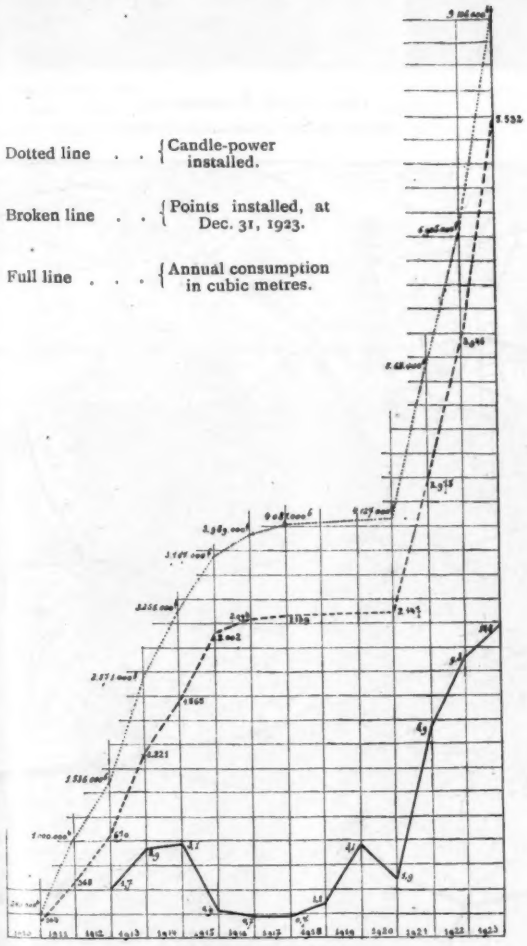
More than 5500 lamps giving a total luminous output of 9 million candle-power spread over 95 kilometres of streets—such was the extent, on Jan. 1, 1924, of the high-pressure gas lighting of Paris, which without doubt is unrivalled in any city in the world and goes on developing from year to year.

HISTORICAL.

The first attempt at high-pressure gas lighting was made by the old Paris Gas Company, in the Champ de Mars, on the occasion of the International Gas Exhibition in 1900. The lighting was by upright burners working at 200 mm. (8 in.) pressure; this being sufficient to inject as primary air practically the whole of that necessary for complete combustion. Though the results obtained at the Exhibition of 1900 roused considerable interest, they did not lead immediately to the conversion of the public highways to high-pressure. The idea, however, took hold abroad, and was applied to the inverted burner, which meanwhile had made its appearance and was known to give a better distribution of light than the upright mantle; and so it came about that while rapid progress in high-pressure work was being registered in London and Berlin, up to 1908 only experiments over a small range of lamps were carried out in Paris.

It was on the occasion of the opening of the Boulevard Raspail, in 1910, that the first important introduction of the principle was made; high-pressure lamps of 2000 and 4000 candles being used in the new street, which is 40 m. (131 ft.) wide and 2 kilometres long. The experiment appeared conclusive to the City Authorities; and since then high-pressure public lighting has not looked back.

The progress made in the number of lamps installed and their luminous output is shown in the graph herewith; the bottom


Dotted line . . { Candle-power installed.
Broken line . . { Points installed, at Dec. 31, 1923.
Full line . . . { Annual consumption in cubic metres.

Paris Public Lighting.

curve registering, in millions of cubic metres, their annual consumption of gas. The latter has not increased in the same proportion as the actual installation figure, for since the war the Municipality, for reasons of economy, has imposed certain lighting restrictions; a reduction of illumination, which normally would take place at midnight, being enforced now at 10 p.m. in the majority of the streets, and some of the three-mantle burners functioning with only two.

MAINS AND COMPRESSOR STATIONS.

The high-pressure pipe lines are fed by a separate system of which the total run on Jan. 1, 1924, was 230 kilometres. The mains are of the usual type by Chameroy in bitumen-coated steel, varying in diameter from 81 to 300 mm. (3 to 12 in.). The complete network on the same date may be classified as follows:

Size of Pipe. Metres.		Length Laid. Metres.
0·027	..	98·40
0·034	..	508·69
0·041	..	1,110·15
0·054	..	3,317·20
0·081	..	119,083·05
0·108	..	44,566·17
0·135	..	2,728·70
0·162	..	46,092·95
0·189	..	496·80
0·216	..	8,682·36
0·300	..	3,001·21
0·500	..	21·58
Total	. . .	229,707·26

The compressor stations are three in number—one on the left bank of the Seine, the Poste Raspail; and two on the right bank,

Place de la Concorde.
With 215 1000-candle lamps.

the Poste du Temple and the Poste St. Didier. These are clearly shown on the accompanying map. The Raspail station comprises two sets of compressors of a capacity of 1000 cub.m. an hour each, and one of 800 cub.m. One of the sets is driven by a gas-engine, and the other two by electric motors. The Temple station has four sets of 1000 cub.m., three being driven by gas engines, and one by electricity. The St. Didier station has the same plant as that at the Temple. At each post one set of compressors is always kept in reserve, ready for immediate service in case of the breakdown of one of the others.

Rue de Castiglione.
With 250-candle lamps at 4-metre intervals in the arcades.

The steady extension of the high-pressure public lighting has made imperative the immediate installation of another set of compressors; but it is impossible to think of placing these at any of the existing points, as the latter are already over-crowded. It has, therefore, been decided to construct this fourth station on the left bank of the river near the Boulevard St. Germain. It is intended here to instal three 1000 cub.m. compressor sets and three 2000 cub.m. sets, of the Roots type, running at 370 r.p.m.

The pressure at the outlet of these stations is 1850 mm. (73 in.) which permits the maintenance of a minimum pressure of 1630 mm. (63 in.) at the lamps themselves. The outlet pressure is kept constant by a mercury-sealed bell regulator. When the pressure in the main passes the desired point, the bell rises and opens a valve which by-passes the inlet and outlet; and a gauge is fitted to show to what extent this valve is opened, and so gives an indication of the excess pressure from the blowers. Between the inlet and outlet of the compressors, there are also fixed regulators the function of which is really the opposite to the above. When the blowers are stopped and the pressure falls in the system, the bells of the subsidiary regulators fall, and open a

valve which passes gas at ordinary pressure to the by-passes of the lamps. Each post has, of course, a back-pressure valve to prevent the reversed driving of a booster if its motor breaks down; and finally there are by-passes which permit the starting-up of a set when the main is already under pressure and allow the machine to be cut out until it has attained its proper speed.

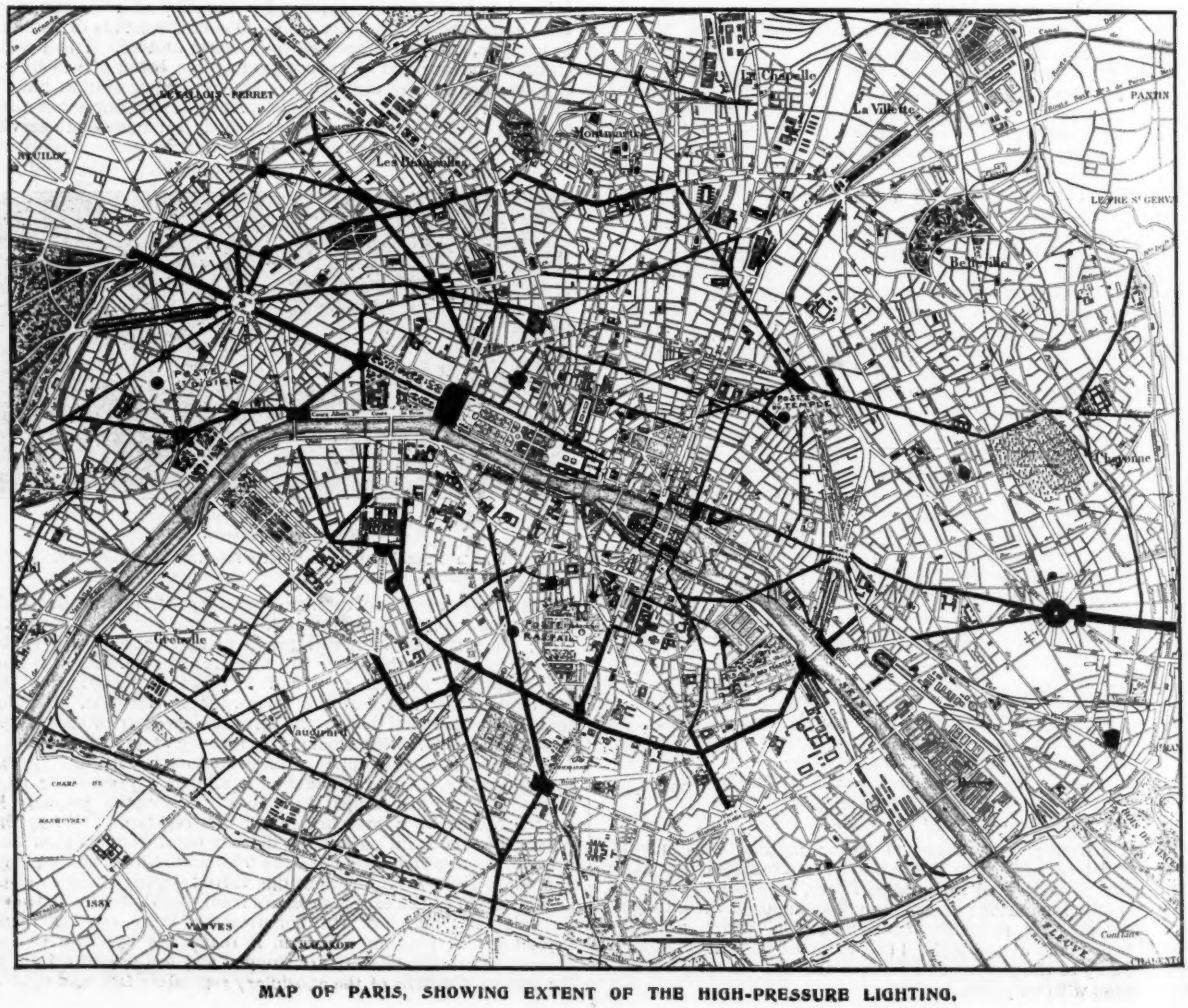
The staff of each station consists of three mechanics who work in continuous shifts. A private telephone line interconnects the

Rue de la Paix.
Standards with 3 lamps, each of 500 c.p.

Avenue du Bois de Boulogne.
Lighted by 4000-candle lamps.

Hotel de Ville.
Four standards, each with five 500-candle lamps.

Place Pigalle Montmartre).
With 2000 and 4000 candle lamps.



MAP OF PARIS, SHOWING EXTENT OF THE HIGH-PRESSURE LIGHTING.

PLACE DES TERNES.
With 2000-candle lamps.

three posts, so that the men can at any moment compare notes on the functioning of their plant; and if by reason of a breakdown the outlet pressure from any post becomes insufficient, one of the two others can immediately remedy the matter by starting up a reserve set. The compression costs amount actually to about 30 frs. per 1000 cub.m. of gas measured at normal pressure.

TYPES OF LAMPS.

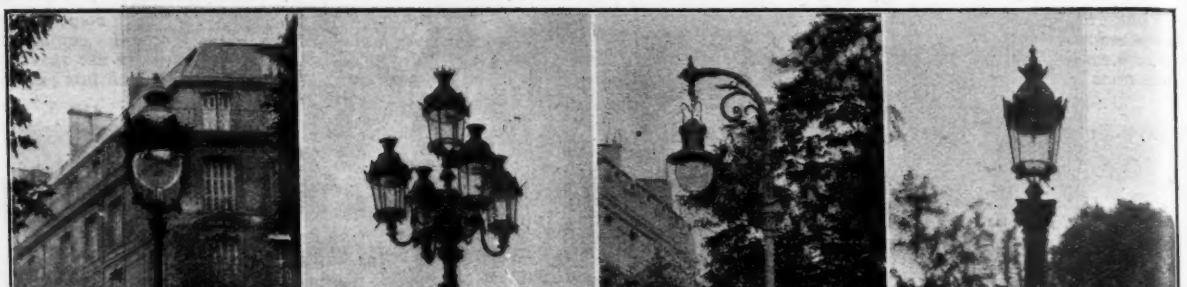
The high-pressure service of Paris is rendered by the following six types of lamps:

Mantles.		Candles.
3	..	4000
3	..	2000
2	..	1200
2	..	1000
1	..	500
1	..	250

One great advantage of the multiple-mantle burner is that it permits a reduction of the lighting at the end of the evening; and, of course, it ensures a good distribution of the light. The hourly consumptions of the various types of lamp are 730 litres per mantle for the 4000 candle lamp; 400 litres per mantle for the 2000 and 1200 candle; 350 litres for the 1000 and 500 candle; and 175 for the 250 candle lamps. These figures express the volume of gas at normal pressure. [200 litres = 7 c.ft.]

In order that the actual consumption of the lamps may approximate as near as possible to the nominal consumption, it is laid down that all the injectors of the high-pressure burners shall be checked and stamped in the Physical Research Laboratory of the Société du Gaz de Paris. Every injector which shows an error of $\pm$ 4 p.ct. is sent back. Injectors are replaced periodically *in situ;* furthermore, tests are carried out from time to time to make sure that the gasways have not been altered by the maintenance men, who know that rigorous penalties are imposed for such action.

PLACE MALESHERBES.
With 2000-candle lamps. The statue is of Alexandre Dumas.



A 2000-Candle Lamp. Ornamental Standard, each Lamp of 500 c.p. The Boulevard St. Germain Lamps of 2000 c.p. "Place de la Concorde" and "Champs Elysees" Type.*

The 4000, 2000, and 1200 candle burners are mounted in globes on ornamental lamp-posts 4½ to 5½ metres high; the 1000-candle burners are fitted in lanterns on 3½ metre posts, and those of 500 c.p. are carried on the ordinary type of lantern used for low-pressure work, or on multiple-arm standards. The 250 candle lamp has been created for the special purpose of lighting the arcades in the Rue de Rivoli; and in the author's opinion, the employment of high-pressure gas for such a low output can only be justified in very special cases when æsthetic reasons are stronger than those of economy.

Control.

The fact that nothing but the public lighting is taken off the high-pressure system has allowed the development of automatic working on the following principle. Some minutes before the time fixed for lighting up, the compressors are started simultaneously in the three stations. The raising of the pressure in the main automatically opens a valve on each lamp, when the gas flows direct to the burners and is ignited by the by-pass flame. When shutting down at the predetermined hour, the boosters are stopped, the pressure falls, and the lamp valves automatically close. At 10 p.m. the lighting is reduced, as mentioned above, by the extinction of two burners in the three-mantle lamps and one in the two-mantle lamps. Up to the present this partial shutting down has been effected by hand by means of a cock on each lamp-post; but arrangements are being made for clockwork controllers to be fitted for this purpose.

The Cost of Installation and Upkeep.

The actual cost of the larger units—that is to say, the 2000 or 4000 candle burners on 5-metre standards—works out at 3500 frs. for the apparatus and its installation, and 4000 frs. for maintenance of the service—a total of 7500 frs. The figures fall to 6000 frs. for the 1000-candle lamp on the 3½ metre standard.

The cost of maintenance of the pipe lines rose during the last accounting year to frs. 0.27 per lamp per day. The maintenance cost of the lamps themselves actually works out to frs. 0.75 and frs. 1.25 per lamp per day for the small and the big units respectively. If we aggregate the costs of maintaining the lamp and the service and that of compression, it is found that the total is less, for the larger units, than frs. 1.75 a day, while the mean consumption of gas represents a cost of frs. 3·7; thus upkeep amounts to only one-third of the total expense. On the contrary, with low-pressure lighting of the most common type in the city—that is, upright burners consuming 80 litres per day—the maintenance costs, excluding upkeep of the service, amount to practically double the cost of the gas.

Conclusion.

Thanks to the quality of the illumination, and to the security which it guarantees, high-pressure public lighting in Paris occupies an impregnable position. Of the 4700 high power lighting units installed since the war, 3400 (or more than two-thirds) employ high pressure. An examination of the map, which shows the roads actually provided with the system, reveals the fact that it has found its way into every quarter of Paris; it is met with in the elegant shopping streets near the Opera, and in the wide avenues which converge at the Etoile, as well as in the main arterial roads further from the centre. This extended use of gas at high pressure for public lighting is still going ahead; and to the 95 kilometres of highway already lighted by this means, will be added many others in the course of a year or two.

* This standard was designed in 1854 by the architect Hittorf, who was also responsible for the two big fountains in the Place de la Concorde. The same lanterns had enclosed flat-flame and early Welsbach burners, and now contain 1000-c.p. high-pressure ones.

INSTITUTION OF CHEMICAL ENGINEERS.

The Second Annual Meeting of the Institution of Chemical Engineers was held at the Hotel Cecil, London, last Wednesday—Sir Arthur Duckham (the President) in the chair.

Annual Report.

The annual report of the Council, which was adopted, dealt with the business transacted during the past year, and referred among other matters to the British Empire Exhibition, the Ramsay Memorial laboratory, the death of Mr. A. C. Flint (Assistant Secretary), and the work of the Education Committee in relation to a memorandum on the training of chemical engineers. Mr. C. J. T. Mackie has been appointed Assistant Secretary. Reference was made in the report to the resignation of Dr. Charles Carpenter as Vice-President, through ill health, and regret was expressed at the reason for this step. Arrangements have been made with the Society of Chemical Industry for "Chemistry and Industry" to be the official journal of the Institution.

Officers and Council.

The President then announced the result of the ballot for officers and Council for next year as follows:

President.—Sir Arthur Duckham.
Vice-Presidents.—Mr. K. B. Quinan and Sir Frederic Nathan.
Hon. Secretary.—Prof. J. W. Hinchley.
Hon. Treasurer.—Mr. F. H. Rogers.
Members of Council.—Mr. J. Arthur Reavell, Dr. W. B. Davidson, Mr. James M'Gregor, Prof. E. C. Williams, and Mr. E. L. Randall (Associate Member).

THE PRESIDENT'S ADDRESS.

Sir Arthur Duckham said the new Institution had two attractions for him—the first, that it might be the last straw that would break the camel of technical societies' back—or, as it might be better put, that the new Institution might be the last addition to the already concentrated solution of technical societies that would cause precipitation—and the second, that it would give a definite status to the body of men who must be responsible for industrial development in the future—*i.e.*, the chemical engineers. The President of the Institution of Civil Engineers (Sir Charles

Morgan) had recently asked: "What is the need for so many institutions and societies? Why could not the parent Institution fulfil the requirements of the technical investigator and administrator?" The reason given was that specialization had grown so rapidly, and the lines of development were so numerous, that no such institution could adequately deal with the needs of its members and provide occasion for the discourse and discussion of the many complex branches of engineering, chemistry, and physics. Undoubtedly the rapid increase of knowledge had led to ever increasing specializations in investigation; and institutions and societies had been formed in which men and women, working on similar problems, might meet to discuss kindred subjects, and, by personal touch, help on the work of technical development for the benefit of humanity. However, if we looked at the records of any technical society, we found that specialization existed even there, and that comparatively few papers are presented which are of real interest and use to all members. It was easy enough to provide what the specialist required in the matter of councils, but it was to the technical administrator or director that the legion of societies and institutions became an absolute burden. It was to this class of man that we must look for efficient and economic development, but it was not possible that such a man should be an active member of all such societies as might cater for one or more of the lines of his activities.

Take, for example, a gas engineer, as a type with which he was most familiar. Properly speaking, a gas engineer should be a member of at least six technical societies. He had to be responsible for excavation and foundation work; the design and erection of buildings, roofs and steelwork, structures, &c.; the flow of liquids and gases in pipes; and many other phases of civil engineering. Then he should be a first-class mechanical engineer, capable of obtaining the most efficient results from power units, mechanical handling plant, &c. Then, again, to be efficient, he should have a thorough grounding in chemistry, with specialized knowledge of those chemical processes present in a gas-works. A close knowledge of ceramics, and the properties of metals under varying conditions, was necessary for the proper execution of his duties. With the present development of electricity, he must know how to make the best use of it for his own purposes, and how to enter intelligently the competitive field with his own product. Finally, inasmuch as coal is the basis of his whole work, he should keep in close touch with the methods of getting coal, the effect on his work of its varying composition, the chemical and physical side of its carbonization, and the various problems of solid, liquid, and gaseous combustion. No one society caters for the requirements of such a man, and it is impossible for him to belong to, and take part in the activities of, the several bodies dealing with his interests.

Other examples could be taken with like results, and we must begin to realize that the present condition of affairs cannot continue. To what end are we moving? We cannot go on as we are. We must attain some co-ordination between the varying societies; we must endeavour to prevent the overlapping that exists; and, above all, we must try to eliminate the large amount of redundant effort that is apparent to-day. Therefore, he made the following proposals, with due deference: That a Committee be formed composed of (say) two representatives appointed by the Council of each technical society, to consider the whole question. All members of such societies as might agree to join together could become affiliated members of the other societies in the group whose work was of interest to them, at a small annual subscription. Each society should continue as at present to publish its independent records of its proceedings, but the group should publish a joint record of all papers and discussions of general interest that might be presented to any of the societies during the year. A Committee, representing the societies in the group, should be formed to make the choice of papers. Each affiliated member should receive the joint publication and have the right to attend the meetings of any society to which he was affiliated, and take part in the discussions. A central building should be obtained to house the officials of the affiliated societies, containing conference rooms, libraries, reading rooms, &c., to meet the needs of members. It might be possible to combine the existing accommodation owned by the various leading societies into this centralized scheme, and so make full use of existing premises. On considering the whole problem, one realizes the immensity of it, said Sir Arthur. Nevertheless, he strongly pressed the Councils of the various technical societies to consider the proposals, and to take steps to form a Committee of Investigation into the existing conditions.

The Institution of Chemical Engineers was founded because it was becoming more and more apparent that the technical administrators of to-day, and more especially of to-morrow, must have a wider training than in the past; they must be able intelligently to control both the chemist and the engineer working under them, and efficiently to supervise and develop processes based on both technical and engineering facts. As to the future of the Institution, education must be its chief concern, and the diploma of the Institution, obtained probably through the approved examination of existing institutions, should be the hall-mark of the technical administrator.

THE TRAINING OF A CHEMICAL ENGINEER.

Sir FREDERIC NATHAN said he had been asked by the Council to review the work of the Education Committee on the training of a chemical engineer in somewhat greater detail than had been done previously. A definition of a chemical engineer had been drafted by the Provisional Council of the Institution, and was considered and amended at the first meeting of the Education Committee held on Sept. 23, 1923. The definition, as amended, is as follows: "A chemical engineer is a professional man experienced in the design, construction, and operation of plant in which matter undergoes a change of state and composition." Having defined a chemical engineer in general terms, the Education Committee next proceeded to a consideration of the knowledge and attainments members should possess in greater detail than was contained in the paragraphs of the by-laws dealing with the qualifications for membership and associate-membership of the Institution, graduates and students. At the second meeting of the Education Committee, held on Oct. 15, 1923, a memorandum on "The Training of a Chemical Engineer," embodying the general scheme agreed to at the previous meeting, was submitted and discussed. The underlying principle of the training outlined in the memorandum was to equip men who have received a good school education on the modern side, with as thorough a general knowledge as possible of the principles. He dealt fully with what has so far been accomplished, but added that the Committee realize that their work is even now in its early stages, and that there is much still to be done before they will be in a position to lay down the qualifications, and the way they are to be obtained, which will make a man capable of designing, constructing, and operating plant and works in which matter undergoes a change of state and composition, and so equip him for a profession which is bound to play an ever increasingly important part in the development of the chemical and allied industries of the Empire.

The PRESIDENT said the subject of the education of men to take administrative posts in business was an important one, because of the difficulty in the past of obtaining properly trained men for the work. He had found that the training of an engineer or a chemist, as such, was very often superficial. What was wanted was an absolutely sound knowledge of fundamentals, because without this it was impossible for an engineer or a chemist to work out the necessary short cuts in carrying out his work. Very often the fundamental things were missed or passed over, and the final result obtained was not that which ought to have been obtained. This was one of the most important points to be considered in the training of chemical engineers, because he was convinced that the technical administrators in the future, the men who would be responsible for the efficient working of manufacturing processes, must be chemical engineers.

Mr. E. A. ALLIOTT said that in the Massachusetts Institute of Technology the training of chemical engineers for the last six months included work actually in the factory, so that the students had the opportunity, in charge of their professor, to study practical works problems as they arise in everyday practice. He also thought that the training of a chemical engineer should include a period on the business side, and he was not at all sure that the sales department in many businesses was not the very best for bringing the business point of view home to the student.

Prof. J. W. HINCHLEY said he hoped that every member of the Institution would use his influence in providing means of entry for students into works in the manner suggested by Mr. Alliott.

Dr. W. M. TRAVERS said the question of deciding upon the education of a chemical engineer was not an easy one. He had looked through the scheme which had been prepared, and it appeared to include the whole of industry. It seemed to him, however, that a man must specialize, and take only certain parts of it, for the simple reason that the problems in many branches of industry which called for the services of the chemical engineer differed very considerably; and for a man to take the whole general course as laid down might not necessarily fit him to take on any branch of chemical engineering.

Prof. SMITHELLS said that most of the discussion hitherto had been with regard to the training of the chemical engineer in general, but he would like consideration to be given to the training of the chemical engineer in particular. The term "chemical engineer" was a very ambitious title, and therefore at Leeds University there had been deliberately established separate departments to deal with separate branches of industry. He had looked cursorily through the scheme which had been prepared by the Institution, and could see what was being aimed at. It was very admirable, but was it practicable simply on the grounds of the claims of time? The course would take at least six years, whereas three or four years was the most that students could afford in the ordinary way. After all, there was one thing which no course could teach, and that was experience. It was for these reasons that he advocated attention being given to the chemical engineer in particular, rather than the chemical engineer in general.

Official Guide to Wembley.—A new Official Guide to the British Empire Exhibition has just been prepared. The new guide contains much additional information which could not be included in the original guide, and is really a most instructive and interesting account of this great undertaking.

A New Publication for Gas Engineers.—Messrs. Ernest Benn Limited, of No. 8, Bouverie Street, E.C. 4, have published a "Gas Engineer's Compendium." This is a collection of statistics, formulæ, rules, and data for the everyday use of gas-works officials and students. The price of the new volume, which will shortly be reviewed in our columns, is 32s. 6d.

PIONEERS OF EMPIRE.*

Comfort in the Home.

[Reprinted by the kind permission of the Proprietors of "Punch," from the issue dated July 9.]

The signboard said "Gas," and we followed where it led.

The room was high, spacious, and oval. All round the edge of it were elegantly furnished compartments in which sat persons of the female gender doing nothing in particular. There was a frieze of large gilt letters saying

THE SEVEN AGES OF WOMAN.

I put the Illustrator on a chair while I went round and peered at one or two of the compartments. Then I button-holed a young man in a morning-coat.

"Well, what about the gas?" I inquired.

"What about what gas?" he said.

"I don't see any gas," I said.

"You can't see gas," he explained.

"I can't smell any gas," I said.

"Each of these little rooms," he pointed out, "has a gas-fire."

"I know they have, my merry fellow," I answered, "I know they have. But I don't see that any of them are lit. How can one tell that one kind of fire is better that any other kind of fire

Missing Exhibits. No. 1.

British plumber locating an escape of gas.

when it isn't burning? Take this one with a baby and nurse in it. Why don't you light the gas-fire and let the nurse warm the baby's toes?"

"It's a wax baby," he said. "It's a doll."

"Then it would warm all the better, my man. Light the fire, make the nurse drop baby, and show that if it fell on a gas-fire it would simply bounce off, whereas with an open one it would be absolutely ruined. And look at those two young girls in the next compartment. What are they doing? Cutting out bits of paper and sticking them on the wall. What's that got to do with gas?"

I spoke sharply to him.

"You ought to read the notice," he said.

I read it:—

"*In the playroom gas provides at call hot water—hot glue for Daddy—and radiant heat.*"

"What in thunder does Daddy want hot glue for?" I asked with some warmth.

"To mend the children's toys."

"Great Scott!" I ejaculated. "And how does Mummy fill up her days, I should like to know? What are the children doing here at all? They ought to be at school. Why aren't they at school? It isn't holiday time. Making a mess with bits of paper and things. Anyhow, the fire isn't lit here either. There aren't any matches. How is Daddy to come in and make his hot glue without matches? Who are these other idle young persons further on?"

"They are elder children—in the schoolroom, you know. And then there is a college girl."

"Good heavens!" I said, "and can't *she* shake off the gas habit?"

"Not a bit of it," he said. "She doesn't want to. She is a nurse-probationer. You aren't reading the notices properly."

I read another.

"*Gas has been aptly termed,*" it said, "*NURSE'S THIRD HAND.*"

"Who said that?" I asked rather sharply. "Ruskin or Carlyle? I believe you invented it yourselves. Why is she wasting her time, anyhow, reading a book, when she ought to be learning to turn on the gas-fire? Does she know how to do it?"

"Think of the heat," he expostulated, "if we had all these gas-fires lit on a summer day!"

"You could have put blocks of ice round the room, couldn't you, stupid, or had it refrigerated in some way? What's this? A kitchen?"

"Yes," he said. "And this young lady is using a gas-cooker."

"Don't talk to me about that!" I cried. "I don't want to see a young lady using a gas-cooker. I have one in my own home—outings Wednesdays; when does yours go out? Ours has more taps than yours. I tried to boil a kettle myself once, but I couldn't find out which bit had been turned on until I burnt my fingers. Why isn't every tap and jet painted to match like croquet mallets and croquet balls? Do you get any mice in this kitchen? Who is the poor old lady in the room over there?"

"That is grandmother," he said.

I went across to grandmother's room.

"*Gas,*" I read, "*is grandmother's good friend, because it provides her with ready warmth in every form within her own quarters—a cheerful fire at any hour.*"

"I don't think you know very much about grandmothers," I said. "They can't go stooping about at any hour turning on and off gas-fires. Exploding like a machine-gun. And what is the matter with grandmother's cat?"

"It is a china cat," he explained.

"I see. I thought it had been gassed," I said. "Tell me about this next place, this boiler room or distillery or whatever it is."

"It is a bath-room," he explained, "with geysers in it."

"It has about thirteen geysers," I said, "and only one bath. How are you going to bathe all these people in one bath? Besides, there isn't anybody bathing at all. Why isn't there anybody bathing in the bath?"

"Well, we could hardly——," he began.

Missing Exhibits. No. 2.

Auntie in a hot corner.

"Perhaps not," I said. "Still, this is a gas exhibition, isn't it? There's my friend over there, of course. He might do."

I looked at the Illustrator doubtfully. He was still sitting on his armchair trying to make a picture of a gas-cooker, and getting the handles all mixed up.

"He usually samples all the machines at the Exhibition," I explained. "If we could get him inside somehow and turn on all the geysers at once——"

"There are several other rooms," said the young man hastily, "that you haven't looked at yet."

He showed me what he said was a study.

"*The man of affairs,*" ran the placard, "*requires freedom from worries and interruptions.*"

I was now thoroughly enraged.

"Do you mean to tell me," I said, "that the man of affairs sits by that gas-fire and gets freedom from worries and interruptions?"

"Undoubtedly."

"Then will you kindly point out," I asked triumphantly, "what he knocks his pipe out into?"

"Perhaps you will like this room better," he suggested, waving me on.

* In the "Journal" last week, a letter appeared from Dr. Charles Carpenter, in which he intimated that an occasional dose of propaganda among ourselves was not at all a bad thing. He had found in "Punch" a delightful commentary on the Gas Exhibit at Wembley; and he suggested that an effort should be made to "enshrine" this in the bound volumes of the "Journal." Following the suggestion, we asked for, and were kindly given, the necessary permission by the proprietors of our famous contemporary.

It was a handsome-looking apartment. I read the label carefully:

"*A gas-fire is my lady's fire where daintiness desires to reign.*"

"That ought to have been put in verse really," I said.

"The gas-fire is the best of fires
For any châtelaine
Wherever daintiness desires,
Or elegance, to reign."

Rather like DRINKWATER really.

All the same, gas stupefies the Peke.

"A rather popular exhibit, if you'd thought of it," I said, "would have been a cellar, with the man coming to inspect the meter; or a plumber mending leaks; or the seven ages of a female therm."

At this point the Illustrator, who had left his chair and was wandering vaguely round, came up to us.

"I've just asked the college girl to make me a cake on her little students' stove," he said, "but she wouldn't."

"I don't suppose she could," I said. "I don't believe there's any gas in this Exhibition at all. Nothing but electric light. Why do you have electric light instead of gas in my lady's boudoir? Look here; and I pressed down the knob on the wall.

"That's not an electric light switch," he said, turning it off. "That's a gas switch."

"A gas which?" I said, turning it on again.

"A gas switch," he said, turning it off. "Incandescent, you know."

"Oh!" I said, feeling rather humiliated. "Possibly I have been a little too querulous. But before we go perhaps you would like to know who my friend and I are?"

He tried to look as if he would.

"We are unemployed," I explained, "that's what we are. He is a chimney-sweeper, and I am the man that cleans the flues."

"I guessed as much," he said.

EVOE.

Missing Exhibits. No. 3.
Chimney-sweep fails to appreciate his wife's installation of a gas-fire in her boudoir.

CARBONIZATION OF COAL IN BULK.

A New Phase in the Work of the Woodall-Duckham Company.

Great advances in coke-oven construction have been made since 1918, and they have resulted from the reduction of coking times and the increased capacity of the ovens. The former has been made possible by improvement in the design of the ovens, by narrowing them, by employing high-grade silica bricks, and by the use of dry coal. Increased capacity has been obtained by increasing the height and length of the oven. These advances, say the Woodall-Duckham Vertical Retort and Oven Construction Company (1920) Ltd., in a well-prepared booklet on the subject, which they have just published, are embodied in the Becker oven. For some time past this firm have been interested in the Becker oven, and have sent members of their staff to America to study the various phases of its construction, heating, and operation. They have now entered into an agreement with the Koppers Company of America to erect Becker ovens in Great Britain and the British Empire (excepting Canada).

THE BECKER OVEN.

The chief feature of the Becker oven is the cross-over flue, with the accompanying reduced area of the horizontal flue. Four or more vertical flues are collected into a horizontal flue, and the heating gases are transferred to the other side of the oven by the cross-over flue, for similar symmetrical distribution. The horizontal flue, therefore, instead of having to convey a large volume of gas from one end of the oven to the other, only has to convey a small proportion a short distance to the nearest cross-over flue. The horizontal flue can thus be of a very small area, and it is possible to place this so high in the oven that it has no cooling effect on the top charge of the coal. Further, since the gas flames can reach right up to this horizontal flue, even heating is obtained over the whole surface of the heating wall. The consequence of this is that the face of the coal is heated throughout at practically the same temperature. Coking is therefore effected as rapidly as possible without under-coking the top of the charge or over-coking the lower part. This rapid coking permits high volatile coals (which hitherto were unsuitable without mixing with other coal) to be converted into an entirely satisfactory coke. The small horizontal flue also ensures greater structural strength. The narrowing of the ovens from 24 in. to 13½ in. has resulted in greater coking capacity per oven and a more uniform quality of coke.

COAL DRYING.

At all times it is important that coal as dry as possible should be used for coking purposes, whether the ovens are constructed of fireclay or of silica material. Besides being liable to cause damage to the brickwork, excessive moisture is an unproductive amount of tonnage to handle, the steam from it puts unnecessary work on the condensing plant, and by weakening the ammoniacal liquor it adds to the cost of sulphate making. The Woodall-Duckham Company have acquired the rights for this country and the Empire (except Canada) of the Carpenter centrifuge. This machine is approximately 10 ft. in diameter, and will dry up to 100 tons of coal per hour. Five of these plants are in operation at the bye-product plant of the Colorado Fuel and Iron Company, Pueblo; and experience over a considerable period proves them to be most effective. The plant has many advantages. It is compact; the feed and discharge are continuous, and there are no special mechanical parts to be operated for this purpose; the power required is about 1 H.P. per ton of coal treated, depending on the fineness of the coal; the moisture content of the coal is reduced to 5 p.ct.; and first cost and maintenance charges are low.

REFRACTORY MATERIALS.

Perhaps the most important factor in coke-oven construction is the quality of the refractory materials. Straight clay bricks are unsatisfactory, for continual shrinkage under working conditions results in leaking ovens. Siliceous bricks containing about 80 p.ct. of silica do not shrink, but their fusion point is dangerously low for modern working conditions, and their surface is readily attacked by salts in the coal, especially when wet charges are used. A true silica brick offers the best solution to the difficulty, and to this the Woodall-Duckham Company have given close attention. They have developed a special laboratory for research in, and the testing of, refractory materials. The following results of recent tests in British material are of interest: Percentage composition, SiO_2 95·20, TiO_2 0·10, Al_2O_3 0·94 Fe_2O_3 1·06, MgO 0·10, CaO 1·88, K_2O and Na_2O 0·72. The average after-expansion when heated for two hours at 1410° C. was 0·15 p.ct., and the fusion point equalled Cone 32-33 (approximately 1720° C).

WORKING RESULTS OF BECKER OVENS.

The following are the results of the working of a typical battery of Becker ovens:

37 ovens, each carbonizing	25·6 tons per day.
Coking time	11 hours 26 mins.
Total coal per day	946 tons.
Total coke per day	732 tons.
Coke yield per ton of coal	75·75 p.ct.
Furnace coke yield per ton of coal	70·05 p.ct.
Breeze yield per ton of coal	5·70 p.ct.
Total gas make (debenzolized) per ton	12,700 c.ft.
Calorific value (debenzolized)	555 B.Th.U.
Tar yield per ton of coal	11·5 gallons.
Sulphate yield per ton of coal	28·2 gallons.
Light oil yield per ton of coal	3·76 gallons.
Surplus gas	63 p.ct.

The coal used was straight high-volatile coal containing 33·60 p.ct. of volatile matter and 9·25 p.ct. of ash. The coke as delivered to the furnace contained 1·11 p.ct. of moisture; 0·67 p.ct. of volatile matter; and 11·79 p.ct. of ash.

British Cast Iron Research Association Laboratories.—A further stage in the development of the Cast Iron Research Association was reached a few days ago, when the Association formally took possession of their laboratories. These are situated in Guildford Street, Birmingham, and are equipped for the conduct of chemical analysis and general metallurgical and heat treatment work. The capacity of the Association to deal with their work will be greatly increased, but it is not intended to abandon the policy of having investigations conducted in prominent university laboratories and in the works of members.

SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

VISIT TO THE FUEL RESEARCH STATION.

Some Details of Recent Work.

About forty members of the Eastern District of the Southern Association of Gas Engineers and Managers paid a visit to the Fuel Research Station of the Fuel Research Board, at Greenwich, on Tuesday, July 15, where they spent a most interesting and instructive afternoon. The party were received at the entrance to the Research Station by Dr. C. H. Lander, the Director of the Station, and also by Engineer-Captain J. Fraser-Shaw, R.N., the Chief Engineer. Nothing could have been more calculated to set the visitors at ease than their friendly reception. There was no question of conducting the party round in any ordered sequence; the whole place was thrown open to them to wander where they pleased; and in every department an official was there ready to give any information and answer any questions, critical or otherwise. At the same time, in order to assist the visitors to get the greatest advantage from the short time at their disposal, an outline was given of the principal work now in progress.

In the "JOURNAL" for Oct. 17 last, we gave a general survey of the work then being carried out at the station; and the opportunity is now afforded to bring the account up to date. In this we were assisted with the utmost willingness by Dr. Lander, Captain Fraser-Shaw, and Mr. Sinnatt in particular, and by other members of the staff in general; and we take this opportunity to express our appreciation of the assistance afforded. Our last article, of course, was written only a relatively short time ago; and it may, perhaps, be expecting too much to look for startling developments in a matter of six or seven months. It must be appreciated that in any research work the number of negative results obtained, in a particular period, must often exceed the positive results. It is only by finding out the directions in which progress can best be made by eliminating the unlikely ones that a direct line of action can be determined upon; and in a research station of the nature of H.M. Fuel Research Station, this is, perhaps, more true than in many other cases.

In addressing the party on their arrival, Captain Fraser-Shaw briefly mentioned that there were in progress experiments suggested by Mr. S. Tagg, upon the enrichment of gas in the Glover-West retorts—to which more detailed reference is made later—and also experiments with boilers using various sizes of fuel, with and without a feed regulator. There has also been installed a "Columbus" coke separator, which has been found very useful.

A few minutes later Dr. Lander joined the party, and also offered a cordial welcome. In giving an indication of the work being done at the station, he said that it was a logical sequence of that started in 1918-19, which resulted in the Gas Regulation Act. It might be remembered that the Fuel Research Board were responsible for the experimental work which led to the recommendations for charging for gas on the calorific basis. The first thing done was the series of experiments upon steaming in vertical retorts, with which they were familiar, because the Institution of Gas Engineers Gas Investigation Committee had done similar work at Uddingston. The Fuel Research Board were able to use certain coals which were not used at Uddingston. Since that time, further work had been done upon other coals; and since the first experiments, which finished with Lanarkshire Main and Ell coals, research had been carried out on Welsh, Durham, Scotch, Yorkshire, and Lancashire coals. This work brought the position down to twelve months ago, when it was considered that sufficient had been done in this direction, unless the Board were asked directly to carry out particular experiments. As a matter of fact, special work of this character had been done for the South Metropolitan Gas Company on particular coals, and a report would shortly be issued giving a comparison of the results obtained in vertical and horizontal retorts. This report would deal with coals from different parts of the country; and the coals selected were suggested by prominent members of the gas industry. Then work was being done upon increasing the make of gas in vertical retorts. Considerable information had been obtained as to the distribution of temperature within the mass of coal in the retort, and isothermal lines had been determined. Following upon this, experiments were being carried out, on the suggestion of Mr. Tagg, upon the effect of the carburation of oil inside the mass of coal in the retort. The temperature of the different portions in the Glover-West vertical retorts having been determined, a tube was passed into the coal, and through the tube a quantity of oil was injected and cracked. The results so far had shown fairly large yields of gas, amounting to about 95 therms of 520 B.Th.U. The whole object of this work was to increase the elasticity of retorts to enable gas undertakings to get over a bad time by the adoption of what was really a very simple type of apparatus.

BRIQUETTING.

With regard to research on briquetting, a good deal of progress has been made in the fundamental work rather than the practical; but up to the present it has not been possible to make the briquettes sufficiently robust to stand the subsequent treatment in the retorts. The trouble in the retorts is the excessive amount of dust that is formed; and a series of experiments have been carried out to ascertain the effect of incorporating a certain amount of pitch in an endeavour to reduce this quantity of dust. At the same time, it is recognized that the briquetting machine being used is not ideal for the purpose; and work is in progress upon a new design. In the low-temperature vertical retorts, experiments are being conducted with different classes of coal of a non-caking variety, and also mixtures of caking and non-caking coals; while work has been carried out upon fuels of different grades of grinding and cokes of different types.

Referring again to the work being carried out on the cracking of oil in vertical retorts, the oil tube, which is water jacketed, is carried down the retort to a spot where, by means of the isothermal lines, it is known that the temperature is about 750° C. Other results, of course, are obtained, when the oil is injected at other parts of the mass of fuel. An interesting feature of these experiments is the efficiency of the cracking of the oil; and this is ascribed to the fact that it is possible to inject the oil into the mass of fuel at the spot where the temperature is correct for the work.

THE LESSING TAR PLANT.

Considerable interest was shown in the Lessing tar plant which is installed. The object of this process is to work-up tar into oil and pitch at a low temperature, so as to avoid the cracking associated with ordinary tar distillation, and to recover liquid and solid constituents as they are present in tar, without any decomposition. The process (which is fully described in Patent No. 130,362 of Jan. 28, 1918) consists in treating the tar with a special non-aromatic solvent whereby the pitch is precipitated and all the oils are dissolved. The process is carried out at a temperature above the melting point of the pitch and below the initial boiling point of the solvent; and thus a sharp separation of pitch and oils takes place at a temperature of approximately 100° C. The recovery of tar acids and bases can be effected from the oil solution more simply and completely than by the usual extraction of the oils themselves. The plant is designed on the continuous principle; the tar being fed in a steady stream into the extractor, where it is treated by the solvent with gentle stirring. The pitch is drawn off either continuously or intermittently from the bottom of the extractor. The oil solution passes into a fractionating column charged with Lessing patent contact rings. The oil, freed from every trace of solvent, and complying with the Admiralty specification as to flash point, runs from the bottom outlet into the oil receiver. The solvent vapours are condensed in a reflux condenser, and the condensate is returned to the extractor without being cooled below the temperature of condensation. Thus great heat economy is effected, and temperature differences between any points of the plant are reduced to a minimum. The plant is designed so that the loss of solvent is negligible. In the case of low-temperature tars and any tars practically free from aromatic compounds in their lower fractions, a full yield of spirit boiling below the "cutting" point selected is obtained by passing the excess vapours through a final condenser. The oil obtained has a peculiar red colour, high specific gravity, low viscosity, and mixes with petroleum oils or distillates in any proportions. On distillation the ordinary run of tar products is obtained without the disadvantage of thermal decomposition. The process can therefore be applied to great advantage as a preliminary stage in tar distillation, and a great saving is effected. By eliminating the pitch beforehand and by distilling an oil instead of emulsified tar with all its attendant disadvantages, the existing still capacity is considerably increased, the fire risk is reduced, and the burning out of still bottoms is practically done away with. The theory of the process is as interesting as its commercial application is important, for the reactions involved open a new chapter in the chemistry of coal tar. It may be remembered that at the World Power Conference, Dr. Lander said that this plant presents great promise.

BOILER PRACTICE.

Some interesting results are being obtained in the experiments on Lancashire and Cochran boilers with and without a feed regulating device; and special attention may be directed to the experiments, in the same connection, upon different sizes of coke. Three classes are being used—viz., large, small, and breeze—and higher boiler efficiencies are being obtained with the breeze than with the others. Mr. Sinnatt confesses that for the moment he cannot explain this fact, which is contrary to expectation.

PRESENT INVESTIGATIONS.

A further item of interest is that the Treasury have given permission for the scientific staff to be increased. As was inevitable the work of the Research Station is increasing rapidly; and for a while it has been handicapped through the scientific staff being too small. This difficulty, however, is gradually being overcome by increases in the staff which have been authorized by the Treasury. Further progress has been made with regard to the physical and chemical survey of the coalfields of the country. Two Local Committees have already been formed, and negotiations are in hand for the appointment of a third. It is anticipated that other Committees will follow soon, and that the whole country will be provided for in this respect, as was the original intention. The lines of operation contemplated are that these Local Committees will investigate their own local problems, and that the larger problems of national importance will be brought to the Fuel Research Station for treatment.

Reference may be made here to the paper at the World Power Conference by Mr. Sinnatt and Mr. Mitten on coal purification,

because it is the intention to make a general survey of this question, and probably coal purification plant will be put down with a view to exploring this field thoroughly.

In the laboratories a series of tests has been carried out on combustion indicators and CO_2 recorders; and a paper will shortly be issued dealing with the merits and demerits of the different systems.

At the conclusion of the inspection, the visitors were entertained at tea, when a cordial vote of thanks to Dr. Lander and his staff was passed.

Dr. Lander, acknowledging the vote, said it was always a pleasure for those at the Fuel Research Station to receive visitors interested in the work being carried out, and to discuss fuel problems with them, because those responsible for the work there gained as much information in this way as, he hoped, those visiting the station gained from what they saw there.

TECHNICAL METHODS OF CHEMICAL ANALYSIS.*

In the preface to the new edition of this important work the authors explain that the previous edition was mainly a translation from the German treatise entitled "Chemisch-technische Untersuchungs-methoden," originally edited by Dr. Böckmann and revised in several editions by Prof. Lunge. They state that they have considered it preferable to make the new edition more independent and less hampered by the character and subject matter of the German text. For this reason many of the sections have been largely rewritten and several new sections have been added, the whole of the subject matter having been revised and brought up to date. The work is to be published in six separate volumes, each having its own index. A complete index for the whole will be provided. The numerical data for gases and substances connected therewith are all calculated from the real litre weights as ascertained by the most reliable determinations, and not from calculated values. This it is considered is a wise plan. All temperatures are given in Centigrade degrees except in a few special cases. This is also regarded as wise, the use of the two scales, Centigrade and Fahrenheit, being a constant source of annoyance to the chemist.

The different sections of the present volume comprise:

1. General Methods used in Technical Analysis; by C. A Keane.
2. Electrolytic Methods of Chemical Analysis; by H. J. S.. Sand.
3. Physical Measurements employed in Technical Analysis; by J. S. G. Thomas.
4. Technical Gas Analysis; by C. A. Keane and J. S. G. Thomas.
5. Fuel Analysis; by G. N. Huntly.
6. Sulphurous Acid, Sulphuric Acid, and Nitric Acid; by J. T. Dunn and Prof. Lunge.
7. Saltcake and Hydrochloric Acid; by J. T. Dunn and Prof. Lunge.
8. Sodium Carbonate; by J. T. Dunn and Prof. Lunge.
9. The Chlorine Industry; by J. T. Dunn and Prof. Lunge.
10. Cyanogen Compounds; by H. E. Williams.

Of the above, sections (2) and (3) are new.

The description of general laboratory operations leaves a good deal to be desired, especially as regards the preparation of materials for analysis. For example, no mention is made of multiple ball mills for powdering several samples simultaneously. The account of indicators used in analytical work is by no means complete. One looks in vain for a tabulated list giving concisely their uses and properties. Methods of calibration are well and fully described. Figures, however, are not so carefully checked as we should expect. On p. 22 one finds 966·528 instead of 996·528. The excellent chapter on electrolytic methods of chemical analysis will be greatly welcomed, as will also the very useful section on physical measurements employed in technical analysis. The chapter on sulphur, sulphurous acid, sulphuric acid, and nitric acid impresses one with its fullness of information. Too little stress is laid on the freezing points of different strengths of sulphuric acid and oleum—a most important matter in works practice. In this case a curve diagram is most useful.

The sections that most concern readers of the "JOURNAL" are those on technical gas analysis and fuel analysis. The descriptions of various forms of apparatus and methods used in gas analysis are well and fully written in what might be called a general manner. The authors, however, do not set out in a systematic detailed manner the exact method of carrying out a complicated analysis—for example, the analysis of coal gas. In a work of this kind the student expects to find full directions for the use of the best-known apparatus. Some of the figures are not at all clear or good. The stumpy Bunte burette shown in fig. 152 is not a desirable apparatus. Special methods of determining ethylene, benzene, acetylene, oxygen, carbon dioxide, hydrogen sulphide, organic sulphur compounds, ammonia, hydrocyanic acid, and naphthalene in crude and pure illuminating gas are explained at considerable length. In several cases the conversion factors and other essential numerical data are unfortunately missing. It is years since adsorption by means of active charcoal was brought into use as a very reliable and convenient method of determining benzene content in gas, but there is no mention of this. With regard to ammonia, it is hardly correct to say: "Of the total nitrogen present in coal, only some 10 to 14 p.ct. is obtained in the crude coal gas in the form of ammonia." In the writer's experience the amount not infrequently, especially with steaming in vertical retorts, exceeds 20 p.ct. Among apparatus for automatic gas analysis one is glad to see the katharometer described. This, it might be added, has a definite use for measuring and indicating moisture in air or other gas of constant composition.

The chapter on fuel analysis (31 pages) seems to be much too short, considering the importance of the subject. Sampling is dealt with very well, but too briefly; nothing is said of methods of sampling ship coals. Too brief also are the descriptions of methods of estimating moisture, volatile matter, nitrogen, carbon, and hydrogen. The American standard methods of determination, also those of the British Fuel Research Board, ought to be set forth, and in such a way that they can be properly followed in practice. Calorimetry receives comparatively greater attention, as it deserves. The Kroeker bomb is stated to have the advantage of serving for the determination of carbon and hydrogen. It is thought that the chemist would be ill-advised to adopt this method in preference to the ordinary combustion analysis.

A full bibliography of literature bearing on each subject is supplied as foot-notes and at the end of each chapter. This is most useful. There are also all the necessary tables of figures for such data as specific gravity, boiling-point, and the like. The book is printed in the usual good style common to the Lunge treatises.

The general criticism may be made that the treatise, while written in an attractively descriptive manner, is not sufficiently authoritative in laying-down technical methods of chemical analysis. In other words, one hardly, if ever, finds it stated, for example "This is the method we can recommend . . . " or "This is the method prescribed by . . ." When experts write on methods, one expects them to give a more definite lead.

W. B. DAVIDSON.

* Lunge and Keane's "Technical Methods of Chemical Analysis," edited by C. A. Keane and P. C. J. Thorne. Second Edition. Published by Messrs. Gurney & Jackson, No. 33, Paternoster Row, London, E.C., price 63s. net.

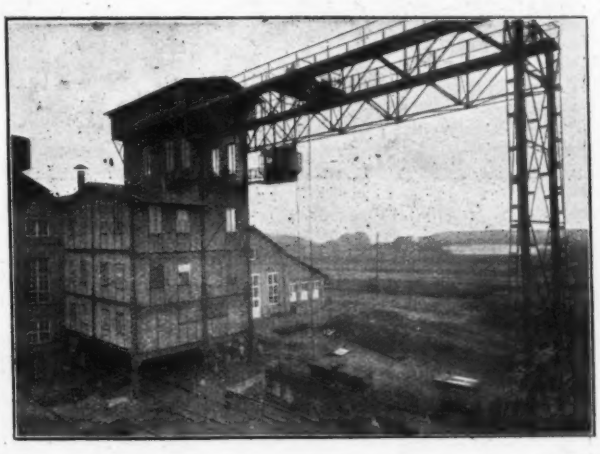
INSPECTION OF THE MAGNETIC PROCESS FOR THE RECOVERY OF FUEL FROM ASHES.

Clean, Simple, and Efficient Separation.

IN the "JOURNAL" for Nov. 28, 1923, a few particulars were given of a plant for the magnetic separation of coke from clinker, installed at the Berne Gas-Works. It was then stated that 1830 tons of ashes treated by this process had yielded 977 tons of coke, 588 tons of which were above 20 mm.—equal to a recovery of 53·4 p.ct. On the Continent magnetic plants are already in operation treating the ashes of gas-works, steel-works, chemical works, &c., to a total capacity of over a million tons per annum. Consequently it was of considerable interest recently to have the privilege of inspecting the first plant of this type in a gas-works in this country.

THE NEW PROCESS.

The invention of this new process is due to Germany; and the Fuel Recovery Syndicate, Ltd., of Westminster Palace Gardens, S.W. 1, have acquired the sole licence for the construction and exploitation of these plants in Great Britain. It is founded on the fact that ashes are attracted within highly concentrated magnetic fields, whereas the magnets have no influence on coal and coke. This difference in their magnetic properties is due to the fact that the ferrous non-magnetic material contained in every class of coal, though in fine distribution, is converted during combustion into magnetic iron compounds which pass into the ash or



20 Ton Per Hour Plant, Showing Grab for Elevating the Ash.

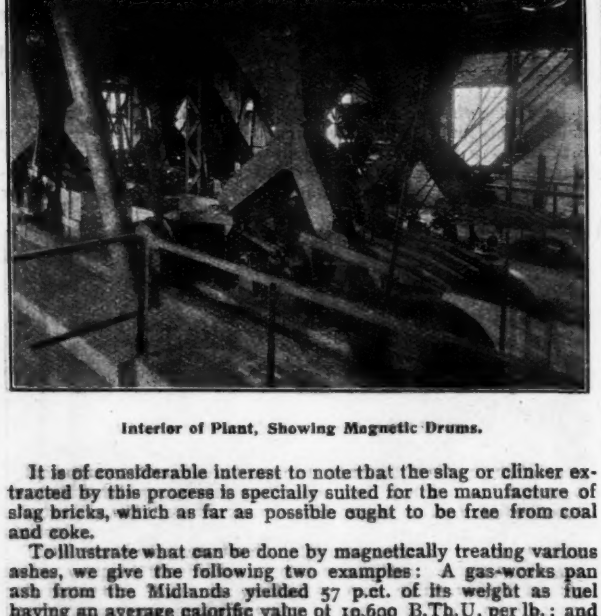
clinker and make them susceptible to magnetic attraction. These magnetic compounds are concentrated in the ash in increased proportion to the percentage of ash contained in the coal. The proportion of unconsumed combustibles in the ashes varies, of course, according to the quality of the coal and the way in which it is burnt. Numerous tests of furnace refuse carried out on the Continent have shown that the recovery of coke and coal on the average exceeds 30 p.ct. of the weight of the crude ashes; while in some cases the yield has amounted to 50 p.ct. Mr. W. S. Patterson, M.Sc., A.I.C., in a recent communication to the Society of Chemical Industry, entitled "Combustible Matter in Boiler Ashes," gave figures for the percentage of carbon in ashes; in some cases these exceeded 30 p.ct.

Operation of the Plant.

The arrangement of a dry-magnetic ash-separating plant is determined by local conditions and the capacity required. For capacities ranging from about ¼ up to 2 tons of crude ashes per hour one magnetic drum will be sufficient, the latter being provided with 1 to 4 magnetic fields. In the plant which was demonstrated to us there is one magnetic drum having two fields. The ashes were uniformly fed to the magnetic drum by a shaking tray or screen. On the drum the separation of the clinker from the coke was effected in such a way that the clinker was attracted by the powerful magnets enclosed within the drum, and adhered to the revolving drum until, after half a revolution, on passing out of the magnetic field, it dropped away; while the coke particles, not being attracted, had been thrown off before this stage. In most cases it is advisable to screen the ashes on their way to the separator into two or more classes, which are automatically conveyed to two or more magnetic fields formed on the drum. We feel sure that the plant is efficient, for the whole process can be visualized, and the action of the drum is surprisingly selective. The working expenses are small; the electric power required for the magnets amounting to about 0·8 to 1 KW. per ton of ashes, while the power required for driving the separator, including the shaking feeder, is only about ½ to ¾ H.P.

Advantages.

One important advantage of the process described lies in the fact that the coke and coal particles are recovered in a dry state; and this is an advantage which will be fully appreciated. The light porous slag is removed by the magnets, and any coal or heavy coke, being non-magnetic, is recovered. Another interesting feature is the efficiency of the plant in dealing with fines; and as this portion often averages about a third of the total material treated, the result is a considerably increased yield of recovered fuel. The plant as a whole is small, simple, and unaffected by climatic conditions. The question whether the installation of a dry-magnetic plant will prove profitable, depends, of course, on the quantity of ashes available and their carbon content. In many cases, say the Fuel Recovery Syndicate, the initial outlay can be written off after one year's working, and under favourable conditions even within a shorter period.



Interior of Plant, Showing Magnetic Drums.

It is of considerable interest to note that the slag or clinker extracted by this process is specially suited for the manufacture of slag bricks, which as far as possible ought to be free from coal and coke.

To illustrate what can be done by magnetically treating various ashes, we give the following two examples: A gas-works pan ash from the Midlands yielded 57 p.ct. of its weight as fuel having an average calorific value of 10,600 B.Th.U. per lb.; and a railway locomotive ash from the South of England yielded 37 p.ct. of its weight of fuel having a calorific value of 9730 B.Th.U. per lb.

BRITISH EMPIRE EXHIBITION NOTES.

Ackroyd and Best, Ltd.

The accompanying photograph illustrates the exhibit of this Morley firm, whose glassware has deservedly won a high reputation. On the stand are to be found all types of lighting glass-

The Exhibit of Messrs. Ackroyd and Best, Ltd.

ware in clear, crystal, opal, opalescent, and heat-resisting qualities, and with hand painted decorations suitable for all manner of applications. Their richly coloured patterns can be made to conform to any colour scheme or illumination arrangement, and also will be found of great value for advertisement purposes. In addition, their miners' safety-lamp glasses are shown. The firm also exhibit a variety of stampings and pressings ranging from simple designs to highly intricate productions.

The Attraction of Movement.

The attractiveness of exhibits at Wembley has proved to depend very largely on whether or not they have movement. People like to see things in action, and there is all the difference in the world between machinery standing idle and machinery at work. Wherever the crowd is densest, you may be sure that something is "happening"—something is being made, or a demonstration is going on. It has been estimated, after careful observation, that on an average not fewer than 30,000 people pass through the Gas Exhibit every day. Even that enormous number is perhaps not remarkable in view of the size of the Exhibit and the fact that it stands in a central position facing two main gangways. What is unusual, however, is that most of the 30,000 not only pass through, but stop to watch and learn. The secret of this is simply that the visitor is confronted, not with an array of inactive appliances and fittings, but with all and sundry kinds of gas apparatus doing work in realistic settings. The whole Exhibit is, indeed, a very real presentation of the part gas plays in both domestic life and industry; and as it combines its busy action with a rest lounge provided with luxurious chairs, there is little reason for surprise at its appeal to thousands.

Treatment of Effluent Spent Liquors from the Distillation of Ammoniacal Liquor.—The continuation of our extract on this subject from the recent report of the Chief Inspector under the Alkali Works Regulation Act (*ante*, p. 324) is unavoidably held over this week.

Commercial Gas Company's Dividend.—The Directors of the Commercial Gas Company have declared a dividend for the half-year ended June 30, 1924, at the rate of 6 p.ct. per annum, less income-tax, on both the 4 p.ct. capital stock and the 3½ p.ct. capital stock, payable Aug. 15. The dividend is at the same rate as that paid for the corresponding half-year of 1923.

Franklin Medal Presented.—At the Foreign Office, Mr. Charles Trevelyan (President of the Board of Education), representing the Prime Minister, delivered to Sir Ernest Rutherford, Cavendish Professor of Physics at Cambridge University, the Franklin Medal and certificate of honorary membership awarded to him by the Franklin Institute of Pennsylvania in recognition of successful researches signally contributing to the present state of knowledge of the elements, their constitution and relationship.

INTERNATIONAL ADVERTISING CONVENTION.

PUBLIC UTILITIES SECTION.

Last week Wembley was the scene of a huge International Advertising Convention, which was opened by the Patron, H.R.H. the Prince of Wales, on Monday, July 14. The delegates, who were thousands strong, included a very large number from the United States, and many from other countries.

As was only fitting, one section was devoted to the consideration of advertising as specially applicable to what are known as Public Utility Undertakings; and representatives who attended were connected with light, heat, power, and transport. This section held two sessions—on Tuesday afternoon and Wednesday morning; and Mr. F. W. Goodenough, who, as Chairman of the British Division of the Committee, had been mainly responsible for the arrangements, was heartily congratulated upon the success which attended the proceedings.

The attendances were good—as were the many papers presented. The President of the Section was Mr. W. P. Strandborg (President of the Public Utilities Association, U.S.A., and Advertising Manager to the Portland (Ore.) Electric Power Company), but he was unfortunately unable to attend. The Committee included many names well known to the gas industry on both sides of the Atlantic; the Chairman of the American Division being Mr. Frank LeRoy Blanchard (Director of Public Relations, Messrs. Henry L. Doherty & Co., New York). In addition there were a number of Vice-Presidents on both sides; those from America being Mr. W. H. Hodge, Mr. J. C. M'Quiston, Mr. B. J. Mullaney, and Mr. P. L. Thomson; and the English ones, Mr. D. Milne Watson, Sir William Kay, Sir James Lyne Devonshire, and Alderman W. Walker.

Some notes from the general proceedings on Tuesday are given this week; leaving over the paper by Mr. Jacques Abady, and an account of Wednesday's session, for subsequent notice.

LUNCHEON.

It was a good idea to preface the serious part of the day's proceedings with what our American friends so often term a "get-together" function—which on this occasion took the form of a gathering at the Lucullus Restaurant, on the invitation of Mr. Goodenough. Here a party of about one hundred sat down to a luncheon that would have been delightful in any case, but which was rendered the more enjoyable by the presence of a number of ladies. Glancing down the list of acceptances, the temptation is strong to mention some of the names, but so many familiar and highly respected ones meet the eye that the recital would prove too long. One remark, however, must be made—if the friends from the United States were (and it obviously was so) gratified at the warmth of the welcome extended to them by their public utility confrères on this side, we on our part were equally gratified at hearing the nice things they had to say of this country and (modesty shall not forbid) of us.

Mr. GOODENOUGH was in the chair, and at his call the toasts of "The King" and "The President of the United States of America" were honoured. He then proposed "Our Visitors from Overseas," to whom he proceeded to extend the heartiest of welcomes in words that had the true ring of sincerity. "We are," he declared, "mighty glad to see you. The more often we meet you—the more we know you—the more we like you. We expected to like you, because of the many pleasing qualities which characterize those who come to see us from that great country across the ocean. All our expectations have, however, been surpassed by the pleasure we have had in meeting you." Proceeding, he explained that the object of the Section was to interest all in the study, not only of public utility advertising for the purpose of selling, but also of service.

Mr. B. J. MULLANEY, responding, said that in this wonderful city the visitors met with surprises on every hand. He thought their pleasure would not have been lessened in the slightest degree if the element of surprise had been somewhat lessened in some respects. "You have," he went on, "developed to a very high degree the talent of self-depreciation. It is an admirable quality; but like many other admirable qualities, it can be overdone, and I think you overdo it. We find everything so much better than we expected that our admiration for what we find might be greater if we understood you a little better before we got here. I believe all of us will take back the hope—and the intention to do our best to realize that hope—for a still better understanding between the English-speaking peoples."

Mr. PHILIP L. THOMSON, who also replied, remarked: "We thought the English people were stoic, but they have taken us right into their arms, and we have appreciated it to the full. It seems to me that if we had more of these functions it would cement the friendship and the love of the English-speaking people of the world, and to my mind that is the finality in so far as this great world of ours is concerned. The English-speaking people must be united. Mr. Goodenough's hospitality has been wonderful, and I only hope the seed we can carry back to America will grow in our country."

Mr. F. LEROY BLANCHARD said there was one toast not on the list, which should be submitted at that time—"Our Chairman and Our Host." It was not a mere formal toast. They had been entertained in a splendid manner by Mr. Goodenough. Ever since their arrival, he had been generous and he had been kind to everyone. They wished to thank Mr. Goodenough heartily for all he had done—and Mrs. Goodenough also. ["Hear, hear."]

The CHAIRMAN acknowledged the compliment.

THE BUSINESS SESSION.

The business meetings of the Section were held in the Cinema Theatre of the Canadian Pacific Railway building, which had been kindly placed by the authorities at the disposal of the Convention.

MR. GOODENOUGH'S ADDRESS OF WELCOME.

Mr. GOODENOUGH, who took the chair at Tuesday's session, expressed his regret that the President (Mr. W. P. Strandborg) had been unable to come over from America. Proceeding to welcome the delegates, he said: On behalf of the Public Utility Services of the British Islands, I extend to our visitors—our friends and colleagues—from overseas the very heartiest of welcomes and the most cordial of thanks for coming here to talk over with us the matters of common interest set forth in our programme, and the many others that, in our gatherings, will doubtless emerge. We are delighted to have you with us; we wish you a happy as well as profitable time in our land; and we hope you will take back with you, as we are sure you will leave behind, many pleasant memories of friendships formed, as well as of mutual services rendered. Could there be better watchwords for us in this conference—indeed, in every day and hour of our business life, of our social life, of our national life, and, yes, especially of our international life—than the words: "Friendship" and "Mutual Service?" Friendship is the only sound basis for all business life; and mutual service is the only sound basis of friendship. Goodwill is the most valuable asset of any enterprise—the goodwill of customers, of employees, of colleagues, of competitors—and goodwill is but another name for friendship; the highest name, indeed, for is it not the practical expression in daily life of the Golden Rule—the Will of God—"Whatsoever ye would that men should do unto you, do ye even so to them?" The spirit of mutual service, based on the love of our fellows, and not on the love of gain—the spirit of co-operation, wherever and whenever co-operation is possible—is the crying need of the world to-day. It will not be established in the world except by the individual, unobtrusive, daily efforts of each one of us; by deeds, and not by words. Our business at this conference is to consider the best practical means for putting that spirit into our work and demonstrating its reality to our fellowmen and women, all day and every day. Let us then get to that business without further words of mine than those with which I began: Welcome All! In declaring the session open, I will read the following statement of policy which underlies our programme, and which I propose, with your permission, to submit to you in the form of a resolution at the conclusion of our meetings:

(1) That it is as important to advertise the services which public utilities can render to the community as it is to advertise the goods of firms which have no monopoly rights of supply.
(2) That goodwill, based upon equitable policy and "service-first" principles, is essential to the permanent prosperity and persistent progress of public utility undertakings.
(3) That advertising is essential to the establishment and maintenance of such goodwill.
(4) That fully educated, efficient salesmen are equally essential.
(5) That the possession of a monopoly, whether by a company or a municipality, imposes on its administrators the duty of a policy of progressive business methods, in the interests of consumers, as well as of stockholders or ratepayers.

THE PRESIDENT'S MESSAGE.

Mr. STRANDBORG, though unable to attend the convention in person, had sent over an inspiring address, which was read to the meeting, and for which the Chairman suitably returned thanks.

In this the President said that neither civilization nor science has, through the processes of modern evolution, developed any material force or agency so essential to the well-being, happiness, and prosperity of the human race as have the several primary public utility industries—gas, electric railways, central stations, water-works, telephone, and telegraph. To the individual and the family group, public utility service represents the "fourth dimension" of human necessity, ranking virtually on a par with the requirements of food, clothing, and shelter. To the community and the state, heat, illumination, power, transportation, and communication stand out as paramount needs. He expressed the hope that there might develop from this gathering the establishment of a Joint Clearing House Committee, one group located in London and the other on the American side, whose function shall be to assist utility and advertising men on both sides to secure prompt and accurate information relating to public utility activities. The personnel of this Joint Committee should consist of one member from each of the major utilities, in order that it may be fully representative of all branches of the industry as a whole.

PUBLIC RELATIONS.

Mr. P. L. THOMSON (Publicity Manager to the Western Electric Company of New York), in an address on "Winning the Public's Goodwill," said that in the United States one of the most remarkable recent developments in the direction of advertising as a useful tool in the conduct of a great business is its recognition by the public service organizations. After the war,

it was seen by the different groups that future development was limited by an entirely new factor—something which had not been named before—their public relations. Now the fact that the well-being of the utilities and the public is inseparable has come into general acceptance. The industries themselves are awake to the fact that sound public relations constitute the keystone of their present success and their future ability to grow and prosper.

He had just come from the annual convention of the National Electric Light Association in Atlantic City, and there the important words in the programme were "Public Relations."

And for this topic, in arranging their programme, they picked the leaders of thought in every field of activity that could possibly be utilized to the end of building a greater recognition of the place of the electric light and power company in the welfare of the individual, the State, and the nation. No less than forty-two addresses were delivered during the course of that week's convention on various aspects of the general topic. Indeed, in America no useful medium of advertising that can be legitimately used by the public service organizations is being overlooked. Obviously they regularly use the newspapers and paid advertising space; but more than that, they cultivate a cordial relationship with the newspaper editors, so that when they have news of interest to the community it is gladly made available for the editors, who are interested in disseminating news. They are educating women through women speakers before women's clubs. They are educating their own employees to the nature of the business, to higher ideals of service to their customers, and to the pride of ownership in their securities. And in all their public contact they are making clear the essential point that the interests of the utility and of the community which it serves are mutual.

Mr. J. W. BEAUCHAMP (British Electrical Development Association) remarked that the influence of a well-arranged advertising campaign on the staff was very good indeed. This should not be overlooked in recommending public utility companies to invest money in advertising. It induced the employees to take a very much greater interest in the business.

The CHAIRMAN thought "investment" was a very good word to use.

COMPANY OWNERSHIP AND OPERATION UNDER PUBLIC CONTROL.

Mr. JACQUES ABADY said Mr. Thomson had given them the benefit of experience in America; and he himself had prepared a paper which set forth experience in England. Mr. Abady then presented a contribution which we shall be reproducing in the next issue of the "JOURNAL."

CUSTOMER OWNERSHIP IN THE UNITED STATES.

Mr. FRANK LEROY BLANCHARD (Advertising Manager, Messrs. Henry L. Doherty & Co., New York) next gave an address in which he marshalled the advantages, as seen from the American point of view, of customer ownership of shareholdings in public utility undertakings, and gave particulars of actual schemes. He said that, according to reports issued by the American Gas Association, there are in America to-day nearly 1000 companies engaged in the gas industry. The total sales in 1914 were 198,000 million c.ft.; and in 1923, they were 370,000 million c.ft., an increase of nearly 100 p.ct. The customers of gas companies in 1921 aggregated 9,291,000, and the population served was 47,700,000. The gross income of the manufactured gas companies in 1921 was $379,263,044; in 1922, $406,000,000, and in 1923, $429,200,000. According to the figures of experts, the cash investment in existing natural and manufactured gas companies amounts to $4,000,000,000.

Although money is money, no matter where it comes from, the organizers and managers of public utility enterprises have recently discovered that it makes all the difference in the world whether it is obtained from a few rich men or from a large number of small investors, and especially from those to whom their service is sold. As the result of their experience, they are practically of one opinion—namely, that the most helpful, and therefore the most desirable, shareholders are their own customers The companies are in constant need of new capital for increasing the productive capacity of their plants and for lengthening their service lines. What group of people are in a better position to know the needs and opportunities of public utilities than the men and women customers who are in close contact with their business? Among its advantages, customer ownership furnishes a company with a market for obtaining at a minimum cost a portion of the capital required; it strengthens the credit position of the company; it stabilizes the market value of shares; it creates goodwill, and thus contributes largely to the establishment of highly desirable public relations. Yet another advantage quoted of customer ownership was the influence it has in bringing about the defeat of movements designed to popularize the municipal ownership of public utilities.

The author gave figures showing that considerable progress is being made by public utility companies in the direction of customer ownership in the United States and Canada. For instance, the American Gas Association report that in the last eight months of 1923, 187 gas companies and a few combined gas and electric companies sold in this way 1,251,640 shares to 227,170 investors.

An outline was given of the plans adopted by Messrs. Henry L. Doherty & Co. in selling their securities to customers of the various undertakings concerned. It seems that Mr. Doherty as far back as 1896 conceived the idea of customer ownership, and subsequently employed it to a limited extent in Denver, Madison, and Columbus. From Sept. 1, 1923, to July 1 of this year, securities of the Cities Service Company and its subsidiaries, having a par value of $5,000,000, were sold, thus adding about 12,000 customers to the organization's list of stockholders, now the fourth largest in the world. Estimates indicate that sales in 1925 will total $10,000,000, and add 20,000 more customer-owners to the lengthening list. The Customer Ownership Department is composed of a general manager, a sales manager, a campaign manager, a special advance man (who gathers information for the advertising department, and who, later, places the advertising locally and secures timely publicity), and three field managers (who, in addition to other duties, instruct and help employees in selling, and report facts on local conditions to their superior, who turns them over to the advertising department).

The interest of the public utility company in the shares sold to customers should not cease when the transaction is closed. Therefore, how to keep customers so well satisfied with their investment that they will want to hold on to their shares as long as possible, is a problem that deserves serious consideration. One of the most practical methods that has been successfully employed in accomplishing this result is that of publicity. Do not, said the author, be content with sending your customers copies of annual reports, which, because of their length or the unattractive cut-and-dried form in which they are presented, are often never read. Let someone who knows how to write entertainingly and convincingly take the really vital and interesting facts, and embody them in a one or two page letter signed by the president or chairman of the board, and mail copies to all customer owners. Nearly everyone who receives such a message will read it, if for no other reason than because it is addressed to him personally, and bears the signature of the company's chief executive. These annual reports should be supplemented by monthly bulletins giving live news about the company's affairs.

Unless the employees, as well as the president and other executives, are thoroughly convinced of the desirability of inviting customers to become partners in the company through the purchase of shares, all efforts will be far less productive than they otherwise would. Any task undertaken by an organization that has behind it the earnest support of its entire personnel, backed by the conviction that its accomplishment will benefit, not only the company itself, but all who participate in it, is bound to be successful.

The CHAIRMAN said the address dealt with a form of activity as yet but little known in this country, but from it they could learn a great deal.

CO-OPERATIVE ADVERTISING OF A PUBLIC UTILITY.

Mr. W. M. MASON (Manager of the British Commercial Gas Association) submitted a paper, the text of which will be found on p. 391 of this issue, which constituted a record of the remarkable work done on behalf of the gas industry of the United Kingdom by his Association, which, he said, was started some twelve years ago mainly through the perseverance of the man who was Chairman that day.

ON THE ELECTRICAL SIDE.

Lieut.-Col. W. A. VIGNOLES, D.S.O., Borough Electrical Engineer at Grimsby, followed with a paper bearing a similar title to Mr. Mason's, but dealing with the electrical development side of the question. He pointed out that the Association which deals with publicity for the electrical undertakings of the country, and which corresponds with the British Commercial Gas Association, comprises not only the separate electrical undertakings, but also contains in its membership the manufacturers' associations, because it is felt that the publicity which produces a demand for electricity is the publicity which produces a demand for the new machinery and for the work of the contractors. The public services of gas, electricity, transport, and communication, being monopolies, or at least semi-monopolies, in their respective districts, offer a particularly fine field for publicity work of this joint or co-operative class. Here there is no danger of a rival securing the benefit of the expenditure on advertising. At worst the money provided in one district may help an undertaking in another; but in these days of constant intercommunication between towns and districts, the growth of an undertaking in one area is sure to affect favourably the growth of similar enterprise in other areas.

To the author's mind, the whole basis of publicity should rest on the satisfied consumer. The service of the public, by the possessors of a monopoly more or less complete, demands that those directing such services should place the interest of the public first and foremost, and that they should endeavour to obtain their confidence, without which no public undertaking can hope to succeed. Public undertakings are subject to criticism to an extent which no private trader need fear, as every other man considers himself an expert in the way they should be managed. All care should therefore be taken to simplify and humanize the relations of the undertaking with the public, so that consumers may obtain individual and sympathetic attention. It is no use advertising unless you know you are going to satisfy the consumers.

According to the author, more support is likely to be available if contributors are brought more closely in touch with the work of the British Electrical Development Association; and a movement has therefore been set on foot to decentralize some of its activities, and to set up local branches or committees, under the

parent body, vested with a considerable measure of autonomy. Several such branches are in being, and the extension of these local committees promises to be extremely valuable. It offers to many a chance they would not otherwise get of helping on the good work, and coming more in contact with their fellow men and the various sections of the industry in different districts.

The number of people or associations now carrying out co-operative advertising on behalf of their members or service is very great, and is increasing. All this work is interesting, but not all of it is good. We must, said the author, remember that in business anything that shows promise is soon widely imitated; and it is clear that some of the publicity efforts are working against one another, and that in the increasing noise made by advertisers it becomes more and more difficult to make the public hear the message it is desired to convey. Advertisers, for this reason, are continually watching for better talent and new ideas. Effective advertising, in consequence, becomes increasingly expensive—at least, it costs more money, though if properly done the expense compared with the results may be no serious matter.

The CHAIRMAN pointed out that the "B.C.G.A." also include manufacturers of appliances. Originally the "B.C.G.A." was suggested by the National Commercial Gas Association of America, which dated still further back.

Mr. B. J. MULLANEY (Chicago) remarked that the National Commercial Gas Association had some rather ambitious plans before the war, but they had to be suspended at that time, and subsequently the organization was amalgamated with the American Gas Association. The American Gas Association had not undertaken a national campaign similar to that described here, but they had done much, through committees and otherwise, to stimulate advertising by the individual gas company in its own locality.

This concluded Tuesday afternoon's sitting.

CO-OPERATIVE ADVERTISING OF A PUBLIC UTILITY.

Being a Brief History of the British Commercial Gas Association.

By W. M. MASON, General Manager, British Commercial Gas Association.

The experiment of endeavouring to unite a whole industry for propaganda purposes is something so out of the ordinary that a brief outline of how it has been successfully accomplished by the British Commercial Gas Association should prove of interest even at a great International Advertising Convention.

HISTORY.

It is of historical value to record that the Gas Association was the first serious experiment in co-operative publicity in this country. Several other important industries have followed the lead, and have generally proved equally successful. The object of this paper is to show how an industry, with over 100 years' experience of active business life behind it, and rightly claiming to be national in every sense of the term has, through the pooled brains of its most progressive business managers, in co-operative effort, become a very material factor, not merely in promoting its own welfare, but in moulding public opinion and educating the people as to the wonderful servant gas is, and can be in an increasing degree, in the domestic, business, and civic life of the community.

NECESSITY.

If it is true that every business needs a medium through which it may tell the world about itself, and that no modern business house can make headway without the motive power of publicity, how much greater must be the necessity for a national industry uniting to this end? The possibilities for service of a national association combining for one common ambition and taking large and small, influential as well as isolated and scattered, units in one powerful organization, will be readily appreciated. This, indeed, was the ideal which progressive gas men had before them in launching the "B.C.G.A." some twelve years ago. The ideal—and "without vision the people perish"—is being translated into accomplished fact by steady practical patience and a genius of the sort that a wise man has assessed at 5 p.ct. inspiration and 95 p.ct. perspiration. The vision was crystallized in the Association's motto, "All for one, and one for all."

Something, it is true, had been done locally in the way of publicity prior to the inauguration of the Association, but not very much, for it must be confessed that in this matter of commercial propaganda the gas industry was considerably behind the times. The main reason to account for such a state of affairs was that for generations gas held a monopoly in a very popular public service, and business came practically unsought.

As far back as 1907, Mr. F. W. Goodenough, the Controller of the Sales Department of the Gas Light and Coke Company, in a paper read at the Institution of Gas Engineers, emphasized the necessity for developing the sale of gas on modern lines; but it was not until October, 1911, that the Publicity Association was formally launched, and in March, 1912, began active service "to promote the commercial prosperity of the gas industry by co-operative action," as the constitution happily expresses it. The faith of the leaders of the movement in the soundness of their principles, as well as their belief that the real business sense of the gas industry would ultimately endorse their policy, has been fully justified.

Though commencing in a comparatively small way, the principles for which the "B.C.G.A." has steadily contended have become generally recognized as sound, and the actual policy and operations of the Association have been conducted in such a broad-minded and progressive spirit, that now nearly 90 p.ct. of the total gas industry in the United Kingdom, as measured by output, is, with the official Association of the manufacturers of gas apparatus, actively linked together in the co-operative movement. It will be observed that there are still some optimists in the gas industry, meaning by this term those who, when the rainy day comes, coolly borrow their neighbours' umbrellas; but the Executive's policy of peaceful persuasion by accomplished fact is steadily making for complete unity of effort. A number of Overseas undertakings, realizing the value of such an Association, particularly on the service side, are also active members. It is a matter for very sincere congratulation by the Executive, as the finest possible testimony to the industry's appreciation of their work, that, as regards both membership and financial support, even during the trying war period, the Association has never gone back, but has steadily gone forward. Money talks, particularly as an endorsement of policy, in a very emphatic manner.

FINANCE.

The basis of contribution is of interest, it being on a fair and equitable plan whereby each member of the Association (gas company or municipal undertaking) pays a subscription according to the amount of gas annually produced. Annual contributions actually range from half-a-guinea to approximately six thousand pounds.

The organization is designed on broad and national lines, the United Kingdom being divided into districts which, in turn, appoint representatives according to the total amount of subscriptions contributed by each district. Individual subscribers have, in addition, the right to nominate representatives as members of the Association on a scale based on contribution, but limited to a total of twelve representatives. There is also an International Membership for individuals connected with the gas industry at home and abroad.

AIMS.

The ultimate aim of the Association is, put briefly, to increase the sale of gas throughout the British Empire. It seeks to achieve this end by employing such methods of publicity as its means permit for making better known to the public the many uses and advantages of gas, and for overcoming those lingering prejudices against its use which are founded upon out-of-date beliefs and unsatisfactory experience of obsolete appliances and methods that have now little relation to modern conditions. If it is true that "contentment is being satisfied with what you haven't got," the gas industry is very discontented, as it realizes that it holds the solution to many domestic and civic problems, and that good, wise, and persistent publicity will steadily educate the public to this way of thinking.

It is realized that local effort can do, and has done, much in this direction; but it has become more and more evident that local effort, however excellent, cannot possibly do all, or nearly all, that needs to be done to defend as well as to develop the best interests of the industry. The Association, moreover, aims at not only augmenting local by national publicity work, but also at being of material assistance in the carrying on of local campaigns by placing the services of first-class advertising experts within the reach of all, and by providing the individual undertakings with high-class advertising matter at wholesale prices.

When it is said that local effort cannot possibly do all that needs to be done to forward the interests of the industry, we have in mind particularly the necessity of centralized efforts for dealing with and informing educational, medical, architectural, sanitary, and other authorities, to say nothing of municipal and Government departments—work which may be and is of widespread and incalculable value, but which obviously cannot be adequately undertaken by any one company or corporation. The Association is the centralized medium by which members make their expenditure on advertising more remunerative.

METHODS.

In the scheme organized by the Association there are three sub-divisions of the publicity campaign:

(1) *National Advertising*—that is, in publications which circulate throughout the British Islands, indeed, throughout the British Empire; for example, the "Times," and other great London dailies; "Punch," the "Graphic," "Country Life," and other illustrated weeklies; the "Strand" and similar magazines; the Technical, Professional, and Trade Press, &c.

(2) *District Advertising*—that is, in "blanket" papers, which circulate in large, yet local, areas of the country; for example, "The Yorkshire Post," "The Liverpool Post," "The Manchester Guardian," "The Glasgow Herald," the "Birmingham Post," &c.

(3) *Purely Local Advertising*—that is, in the local papers, on hoardings, in local programmes, in parish and similar magazines, on fitters' trucks, on the films, by showrooms, and by distributed literature and letters in each district of supply.

The Association conducts the first two branches of this co-ordinated campaign—the national and the district advertising—with the funds subscribed by the supporting undertakings, and

enables its subscribers to conduct the third branch—the purely local advertising—far more effectively and infinitely more economically than any undertaking could do without its assistance. Many members now link up their local advertising with the national, by using Association blocks and "copy."

No individual gas undertaking, however large, could afford to advertise in all or even a small section of the national publications, yet no one will deny that advertisements in papers and periodicals of national repute and widespread circulation attract the attention of customers whose orders and goodwill are worth spending money to secure. To do so would be to deny wisdom to all the leading manufacturers and big business people in the civilized world. Only in that way can the interest of many potential customers be secured in the claims of gas to consideration by the householder, the manufacturer, the doctor, and the educationalist. Gas service is capable of helping mankind at every point from the cradle to the grave, but there are still many who are ignorant of its value.

The national advertisements of the "B.C.G.A." attract interest, and convince thousands of people who have not been convinced by local effort, however thorough and capable the latter may have been. The public regard, and rightly regard, the advertisements of the Association as representing the best possible up-to-date information respecting the possibilities of gas in the home and place of business, and they place reliance upon them which they do not always place upon local claims. Moreover, many people do not read their purely local papers, nor any advertising matter sent them by their own gas-works. And those who do, then their minds have been prepared, have been made receptive, by the advertisements of the Association.

Public Ignorance and Prejudice.

It is not only public ignorance of a negative kind about gas that we have to remedy. There are public prejudices against gas based upon inaccurate information with which we have to deal, and which the national campaign of the Association has already done much to remove.

The prejudice against gas-fires has taken (and in many districts still requires) a considerable amount of killing; but the Association has done and continues to do much valuable work in this connection, both by bringing the facts before the medical and architectural professions, and by bringing the opinions of the medical men who are convinced advocates and users of modern gas apparatus prominently before the public at large. Statements, for instance, that there is more gas sold per acre in the medical specialists' area than anywhere else in London (and, therefore, probably in the Kingdom), that the carrying out of the colossal catering arrangements at Wembley is only made possible by the use of gas, or that the highest peak in the gas output synchronizes with the preparation of the greatest of all national festivals—the English Sunday dinner—are all splendid publicity points in the national propaganda. A striking testimony to the efficiency of the methods employed by the Association is the fact that, whereas some years ago it was the exception to find a medical man who would advocate the use of gas in sick rooms, at the present time it is the exception to find one who is not an advocate of its use.

Again—and this in itself is a vast field for future development—there is widespread ignorance about the industrial use of gas, its almost unlimited possibilities as a fuel, as well as a source of power in our factories and workshops. This will be more fully realized when it is remembered that there are nearly 3000 known and tabulated trades in which gas is used for an average of seven processes in each. A monthly publication dealing mainly with gas in industry, entitled "A Thousand-and-One Uses for Gas," is a valued item in Association activities.

Then, because of its greater novelty, there is even more ignorance about the possibilities of gas for water heating than there is about gas fires, and the Association is doing work of great value to every gas undertaking in the country by constantly bringing the question of hot water supply by gas to the notice of the householder and of business men.

The point that it is necessary and profitable to advertise the uses and advantages of gas in its many-sided forms of service hardly needs further argument at a convention of business experts. We have a good thing to sell; the public is ignorant of many of its possibilities; it is necessary and profitable for us to publish the facts constantly and effectively. That broadly is the case for advertising gas; the reason, in a word, for the inauguration of the Association and the proof of the necessity for its life and work.

Service to Members.

For the purpose of assisting individual undertakings to do their local publicity work at less cost, with less trouble, and with less worry to the local manager, the Association publishes from time to time illustrated examples of advertising matter suitable for insertion in local newspapers, in bazaar, concert, or theatre programmes, in church, chapel, or similar magazines, and in other local advertising media.

The Association also provides for its subscribers, at prices far below those at which the individual undertakings acting for themselves alone could get them produced and printed, a very large assortment of booklets, leaflets, picture postcards, showcards, posters, service folders, and other advertising matter designed to further the sale of gas. Valuable service is being rendered by providing a Bureau of Information and Advice both to the public and to the industry, and the Association is being consulted on both hands to a steadily increasing degree. A section of this Bureau will be found at the entrance to the Lecture Hall.

Publicity Policy.

The outstanding point in Association policy is well worthy of consideration. It is on positive rather than negative lines; a policy of *pro* instead of *anti*. It is always a temptation to hit back when attacked—it certainly is so if you have Scotch blood in your veins—but it is much wiser, as a rule, to "get on with your job." The "B.C.G.A." provides "ammunition" for some of its more militant members to use, on occasion; but its own big guns are all *pro* gas.

The Board of Directors.

It must not be forgotten that the Association has an unpaid Board of Directors in the shape of the Executive Committee, and an unpaid Managing Director in the Executive Chairman, who watch closely over the detailed administration of the Association, and are in turn responsible to an unpaid General Committee, who determine the main lines of administration and policy. These committees comprise most of the leading men in the gas industry—chairmen of boards and committees, as well as chief officers of the subscribing undertakings—representative of every district in the kingdom, and elected, as we have said, on a thoroughly democratic basis. Such a council of subscribers, composed of experienced business men and gas experts, giving their advice and counsel free of charge, constitute an asset of no mean value such as is not available in any ordinary commercial undertaking.

Results.

In this necessarily brief outline of the Association's work, it has been impossible to do more than sketch very lightly the general lines of co-operative policy and methods. No attempt has been made to go into detail, though many of the side-lines in connection with our work and service to members are fascinating. Some may ask, "But what about the results from all this co-operative effort?" The published and well considered statement made (Appendix A) by our greatly esteemed Executive Chairman at the last National Conference of the Association held in Birmingham last autumn, might well be given in answer to the query. The diagram showing the steady and remarkable progress of the industry over a period of years is also significant. The real value of publicity cannot, of course, be judged either by the number of direct inquiries resulting, or by its popularity, any more than by the envy with which it is viewed by competitors. It can only be proved truly successful by the steady increase in business it helps to foster. We do not for a moment claim or suggest that publicity—in the gas industry or anywhere else—is a fairy wand that will, unaided, work wonders. Publicity will never act successfully merely as a substitute for good all-round service. "Quality, Price, and Service are the cardinal virtues of successful trading;" the greatest of these is service, and publicity forms an essential factor in that great business virtue.

The Future.

New ideas are stirring throughout the gas industry in this country, fresh life-blood is coursing through its veins, activity is taking the place of sloth and indifference in every direction, and last, but by no means least, the spirit of co-operation for mutual benefit, both between one gas undertaking and another, and between the makers of gas on the one hand and the manufacturers of appliances on the other, is growing steadily every day, and is becoming a mighty compelling and propelling force in the old gas chariot. The great co-operative Gas Exhibit in the Palace of Industry at Wembley is the latest and one of the most significant illustrations of this statement.

In the creation and fostering of this good spirit, the British Commercial Gas Association has played, and must increasingly play, a leading part. The combination is certainly not, either in intention or in fact, designed—as so many big trust and industrial combines are—to exploit the long-suffering public. It could not, even if it would, for it is hedged about by many safeguards. No industry can more honestly claim to have been free of the vice of profiteering. The ideal is rather, as we have stated, the high ambition to give the best possible service at the least possible cost.

Appendix A.

Statement made by Mr. F. W. Goodenough, Executive Chairman of the "B.C.G.A.," at the Birmingham Conference, October-November, 1923:

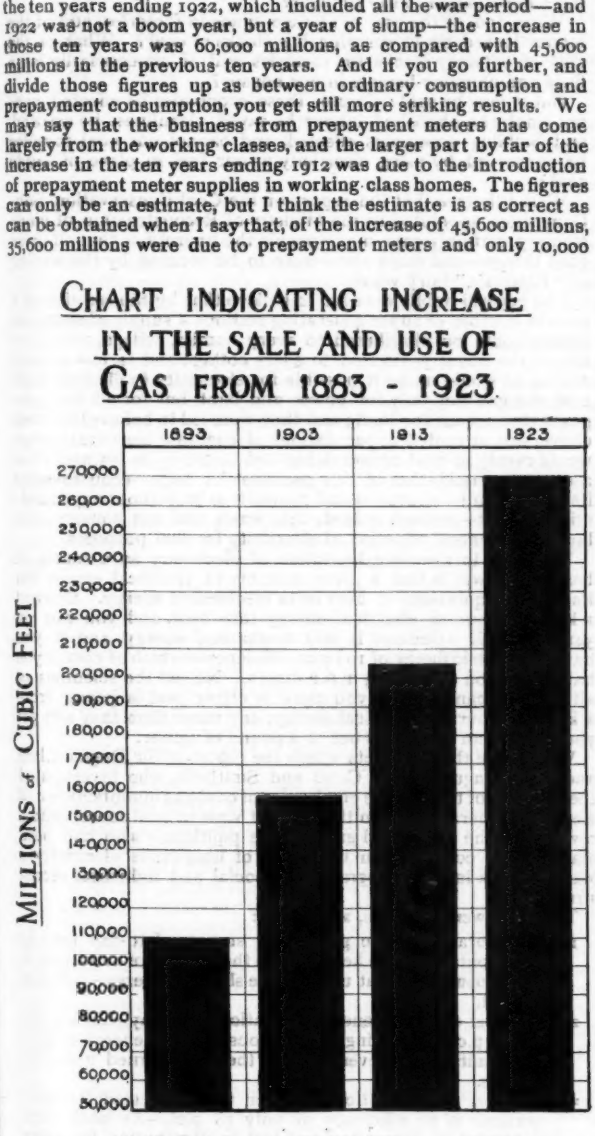
It may perhaps be of interest and value if, instead of looking only at the one year's work, we look for a minute at some figures for the past ten years and the ten years of the decade preceding it. A study of the sales of gas during the past twenty years provides a complete and most encouraging refutation of the idea that the gas industry is stagnating or, as some would even have us believe, moribund. I have had taken out from the Board of Trade returns the figures of the output for each of four periods of five years, and I think they will be of interest. The year 1907 showed an increase over 1902 (I will give the figures in thousands of millions) of 21·9; the year 1912 showed an increase over 1907 of 23·7; the year 1917 showed an increase over 1912 of 27·4, and the year 1922 showed an increase over 1917 of 32·6. In other words, the increase in each of the five years was greater than the increase in the preceding five years. If we take the ten-year periods, we find

Sales of Gas 1902-1922.—In Thousands of Millions of Cubic Feet.

Year.	Gas Sold. By Ordinary Meters.	Gas Sold. By Automatic Meters.*	Gas Sold. Total.	Increase in Five Years. Ordinary.	Increase in Five Years. Automatic.	Increase in Five Years. Total.	Increase in Ten Years. Ordinary.	Increase in Ten Years. Automatic.	Increase in Ten Years. Total.
1902	145·2	14·3	159·2						
1907	149·9	31·5	181·4	4·7	17·2	21·9			
1912	155·2	49 9	205·1	5·3	18·4	23·7	10·0	35·6	45·6
1917	169·5	63·0	232·5	14·3	13·1	27·4			
1922	186·5	78·6	265·1	17·0	15·6	32·6	31·3	28·7	60·0
				41·3	64·3	105·6			

* Estimated on the basis of 15,000 c.ft. per automatic meter per annum, 1902-17.
18,000 " " " " 1922.

the increase for the ten years to 1912 was 45,600 millions, and in the ten years ending 1922, which included all the war period—and 1922 was not a boom year, but a year of slump—the increase in those ten years was 60,000 millions, as compared with 45,600 millions in the previous ten years. And if you go further, and divide those figures up as between ordinary consumption and prepayment consumption, you get still more striking results. We may say that the business from prepayment meters has come largely from the working classes, and the larger part by far of the increase in the ten years ending 1912 was due to the introduction of prepayment meter supplies in working class homes. The figures can only be an estimate, but I think the estimate is as correct as can be obtained when I say that, of the increase of 45,600 millions, 35,600 millions were due to prepayment meters and only 10,000



millions to the increase in ordinary consumption. During the ten years to 1922 the increase by ordinary consumption was not 10,000 millions but 31,300 millions, while the increase due to prepayment supplies was 28,700 millions. So that you see the increase in ordinary consumption, which is the fruit of progressive policy and propaganda, was three times as great during the last ten years as during the preceding ten years, and represented three times the annual output of the City of Birmingham.

Now this is a development of the industry that promises well for the future, especially when it is remembered that every five years has shown better than the previous five years. And while one would be far from claiming that the increased business obtained from the ordinary consumers was due simply to the fact that the "B.C.G.A." has been in operation during those ten years, one can claim that it has been due to the steadily-increasing degree to which progressive policy has been pursued throughout the industry and has been embodied in the work for the industry of the British Commercial Gas Association, which is simply a department of the gas industry.

FIRST WORLD POWER CONFERENCE.

GAS AND FUEL SECTION.

(*Continued from p.* 321).

BELOW is continued our report of the proceedings at the meeting on July 7 of the Gas and Fuel Section of the First World Power Conference at Wembley, which was under the chairmanship of Mr. D. MILNE WATSON.

COKE AS FUEL FOR STEAM RAISING.

By E. W. L. NICOL, Engineer and Fuel Expert to the London Coke Committee.

[An abstract of this paper will be found on p. 255 of the "Journal" for July 9.]

Mr. NICOL, in introducing the paper, said: I have just seen a price-list of the 400 odd papers presented to this conference. Prices range from 2s. 6d. downwards. The result of my effort is assessed at 9d. There are, however, others priced at 6d., and several at 3d. I should like to overhaul that price-list. I would put the papers contributed to the Gas and Fuel Section in the free list. They are priceless, and should be broadcast, especially among our parochial and parish politicians. It was one of these politicians who the other day said that experts should be on tap—not on top. In yesterday's newspaper, another politician, proclaiming this as emphatically the "Electric Age," laid it down that coal should not be used to generate steam—it should be used to "excite electricity." The same writer says: "No politician, who does not grasp the importance of these facts, is fit to open his mouth on public affairs." In the interest of these well-meaning but misguided people, I have prepared the following supplementary notes on fuel economy and economy in fuel practice, with special reference to Great Britain.

Nothing is more certain than that the world demand for petroleum and petroleum products must soon exceed the world supply, as I have shown in my paper. Coal and coal products are, and must remain to an ever-increasing extent, our most important source of liquid fuels. These liquid fuels—benzole and fuel oils—can be obtained commercially from coal on an adequate scale only by means of distillation by gas-supply authorities, who possess sufficient outlet for the gaseous products of the process. The disposal of the solid product—coke—has in the past been a serious obstacle to large-scale operations. The introduction of coke-burning mechanical stokers at electricity and other power stations has to a large extent eliminated this difficulty.

The need for conserving and supplementing the world production of liquid fuels has been emphasized by this conference. For Great Britain, an adequate and independent supply of liquid hydrocarbons is vital, and essential to our continued prosperity and development. In this country we possess immense resources of solid hydrocarbons, of the best type, in our bituminous coal. Any scheme for the development of our coal resources and for the distribution of potential energy in the form of gas and electricity must be centred on these fundamental facts. The development of power from our coal resources must begin with distillation and bye-products recovery. The carbonization of coal can be carried on commercially on an adequate scale only by those who possess, not merely the necessary knowledge and experience, but also the means of distributing and marketing the gaseous product.

From the national economic point of view, electricity generated from raw coal is a wasteful means of distributing potential energy; 80 p.ct. of the heat value of the coal being lost in the process, and also the whole of the recoverable bye-products. The coke at present produced at British gas-works (8 million tons per annum) is more than sufficient to produce the whole of the electricity used in this country, smokelessly and efficiently. Coke is now used, on its merits as the more economical fuel, at several of the largest power stations in London and Manchester. These power stations are among the most efficient from the thermal and commercial viewpoints, and from the national point of view they are also the most efficient. Compared with raw or pulverized coal, the advantages of coke as fuel for the production of power include the following:

(1) There is practically no difference between the gross and net calorific power of coke.
(2) It requires less furnace volume than coal.
(3) It facilitates the use of low-grade coal which is now lying idle on dumps, and which is rejected and buried in the mines to the extent of 60 to 70 million tons per annum, according to the highest authorities.
(4) It is smokeless, and requires a minimum excess of air.
(5) The efficiency of combustion under suitable conditions is equal to that of pulverized coal.

Now, Sir, I have been privileged to attend several of the sessions of this conference, and as far as I have been able to judge, the discussion has largely centred on the advantages of powdered coal. My friend Mr. Brownlie, among others, is an advocate of pulverized coal. The advocates of this process state that among its advantages is the great one that it eliminates the necessity for removing ash and clinker—simply because the ash is projected through the chimney shaft. [Laughter.] We are told they can use coal containing up to 25 p.ct. of ash. Let us see what that means exactly. In London we burn 18 million

tons of coal a year. Suppose two super-stations were put down to supply our needs, fired by pulverized coal. To do half the work they would have to burn 10,000 tons a day, so that over 2000 tons of ashes would be daily projected from the power station chimneys. We might call one Vesuvius, and the other Stromboli. London, like Pompeii, would eventually be buried in the ashes.

The message that I wish to convey to this conference, from my own personal experience, is that the difficulty which has stood in the way of large-scale coal carbonization—the disposal of the coke—has been definitely, and I might say triumphantly, disposed of. We have now many hand-fired boilers using coke exclusively; that presents little difficulty. We have also some of the largest and the most efficient power stations in London and Manchester using coke, and that in spite of competition from oil fuel and from pulverized coal. Coke is being used at these power stations on its merits, as the more efficient fuel.

No discussion arose on the paper.

FUEL CONSERVATION AND SMOKE ABATEMENT.

By F. W. Goodenough, Executive Chairman of the British Commercial Gas Association; Joint Hon. Secretary of the National Gas Council; Controller of Gas Sales to the Gas Light and Coke Company.

[Extracted.]

Philosophers of all times have realized and emphasized the basic importance of coal and iron in national economy; and not least of coal, as without heat iron ore is of no value. As Lord Moulton once observed: "Let us once begin to import coal, and the end of Britain's industrial and commercial greatness is not far distant." And there is no substitute in sight. Our coal supplies are by no means unlimited—a point some people are inclined to overlook. Spasmodically—ever since Edward Hull and Stanley Jevons in the sixties of last century called our attention in no uncertain language to the urgency of this problem of our dwindling coal resources—we take interest in the subject, write letters to the papers, ask questions in Parliament, and finally appoint a Royal Commission. But then, on learning that we have enough coal-beds to last 600 years at our present rate of consumption, we dismiss the subject from our minds, regardless of the important qualifying facts of the case, which make the danger imminent to this generation. For the problem is not merely—How long will the coal in our coalfields last at the present (or even at an increased) rate of consumption? It is: How long can we win that coal and deliver it to the user at a price that will enable our industries to compete with those of America, Germany, and Japan?

While our Commissions may lull us to sleep with information that we have as yet beneath our feet 200,000 million tons of coal, the United States have 4,000,000 million tons, Canada has 1,000,000 million tons, and Germany has 400,000 million tons. Moreover, Germany uses little more than half, while the United States do not use double the amount of coal that we take from our mines annually. It is therefore imperative that we should secure the highest possible percentage of economy, that we should eliminate waste to the utmost in the production, transport, and utilization of coal.

We were asked some time ago to subscribe £250,000 for the purpose of restoring Westminster Abbey, and we shall want many more quarters of a million pounds to make good the ravages wrought upon other historical buildings in other towns and cities by the inefficient use—the positive abuse—of our coal wealth. And it is not only in the destruction of our buildings that we see the evidence of waste and want of efficiency in the use of coal.

What do we find when we turn to the valuable and important report of the Departmental Committee on Smoke and Noxious Vapours Abatement, set up by the Ministry of Health? That, in the small matter of laundry bills alone, Manchester spends £250,000 per annum—more than it would spend if its air were as clean as that of Harrogate—an extra expenditure enough to restore a Westminster Abbey every year; and this estimate takes no account of the damage to the materials themselves in passing through the gentle hands of the laundrywoman more frequently than would be necessary if the air of Manchester were free from soot. Is that conservation of resources? Or is it waste?

But this is not the worst form of waste of which we are guilty. There is the ghastly waste of human life and energy. Our hospitals and sanatoria are filled with the victims of the smoke shroud that envelops our towns and cities—victims created by waste that efficiency would have preserved. This is clearly shown by the experience of New York. Nearly twenty years ago, after much agitation, laws to prohibit the smoke nuisance were passed—and were not only passed, but enforced—with the result that the atmosphere of New York became entirely untainted by smoke. With what effect? In fifteen years the death rate from tuberculosis in New York was reduced 66 p.ct. At the beginning of the century pulmonary consumption killed 39 persons per 10,000 in New York; to-day the figure is 13 per 10,000.

Figures published by the Public Health Authorities of Glasgow, London, and Manchester unite in emphasizing the unmistakable relationship between periods of fogs and deaths from respiratory diseases. Six days' fog in Manchester in December, 1916, sent up those deaths from 50 per week to 175 per week. Nine days' fog in Glasgow in November—December, 1919, caused the death of 500 persons above the average expectation. Three months' absence of coal smoke during the great stoppage of the mines in 1921 saved the lives of 457 persons in Glasgow; the deaths from respiratory diseases during that period being only 539 as compared with 996 in the corresponding period of 1920—a striking proof of the truth of the old Italian proverb which runs: "All diseases come in the dark and are cured in the sun." Such proofs could be multiplied indefinitely; but enough has been said to justify the statement that we are spending money in this country in vast amounts in enlarging our hospitals, our sanatoria, and our cemeteries, that should be spent in enlarging our gas-works.

And is this all the waste involved in burning crude coal? By no means. What of the waste of transport involved in the retail unloading, loading, and cartage of coal, and the retail removal of ashes? What of the waste of human energy and time in the laying, tending, and clearing-up of fires, in the stoking and clinkering of furnaces, in the carrying to and fro of coals and ashes, in the cleaning of flues, in the cleaning of rooms, and in all the other laborious and dirty work attendant upon the direct combustion of this "solid black combustible substance?" What has Conservation to say to them?

What, too, of the cost of storage space in factories, and of the money locked up in carrying big stocks of coal? What of the cost of chimney stacks for factories and of unnecessarily large flues and chimney-breasts in our houses?

But it may be said: Cannot these economies be effected, cannot smoke be abolished, labour be saved, cleanliness be assured, and building economies effected, and cannot our coal supplies be conserved, by using electricity as our fuel in place of crude coal?

Well, it is true that the report of the Coal Conservation Sub-Committee, appointed by the Ministry of Reconstruction, of pious memory, certainly gave many people the impression that all these good things—and more also—were to be secured by the waving of "Electra's" fairy wand.

The general public were led to believe that by the erection of a certain number of super-generating stations a supply of electrical energy could be distributed to every hamlet, village, town, and city in the country—indeed, to every cottage and farm—at such a price as would make it possible for electricity to displace both coal and gas, not only for power and light, but for all fuel purposes throughout the land; and they were led to believe that such conversion at central super-stations of coal into electrical energy would result in coal conservation and economy in its use. But a critical examination of this promise—or hope—soon revealed its unsubstantial character and proved it to be without any foundation in fact—proved, indeed, that waste and not conservation lay in the general adoption of electricity for fuel purposes.

The great insuperable limitation of electricity as a source of heat and power is that a given quantity of electrical energy has its precise equivalent in heat or in mechanical energy. Convert a kilowatt-hour of electrical energy into heat, and you can get 3411 B.Th.U. Convert it into mechanical energy, and if you have an electric motor of 100 p.ct. efficiency—which of course you have not—you can get 1⅓ B.H.P.-hours. Not all the scientists of all the ages can ever get you more, of either heat or power, from a kilowatt-hour of electrical energy, any more than they can get you more than 16 ounces out of a pound of butter.

What were the cold facts which the report of Sir Dugald Clerk and his colleagues, Profs. Cobb and Smithells, who investigated the question of the relative efficiencies of coal-gas manufacture and electrical generation, from the point of view of coal conservation, revealed to the astonished gaze of the politicians who had been making coal conservation by means of ubiquitous electricity a leading plank in their programme of social and industrial reconstruction?

The facts were, and are, as follows:

1. The average electric generating station of to-day uses-up coal containing 100 heat units in the process of delivering to the consumer 7 heat units in the shape of energy—a loss of 93 p.ct.
2. The most efficient generating station of to-day shows a loss of 88 p.ct., delivering to the consumer as energy only 12 heat units out of every 100 in the coal burned under its boilers.
3. The best result anticipated for the suggested "super" stations is an efficiency of only 18 p.ct.—82 heat units expended in generation and lost in distribution for every 18 delivered to the consumer.
4. Out of every 100 heat units in the coal carbonized at the "good practice" gas-works of to-day (in round figures) 50 are returned to the solid-fuel market as coke; 5 are recovered as tar; 22·5 are expended in the process of manufacture and lost in distribution; and 22·5 reach the consumer as gas. Thus, out of 100 heat units in the coal carbonized 77·5 are delivered to the community and only 22·5 are used up in the process. It will be noted that out of heat units that do not reappear after the process of carbonization as coke or tar—*i.e.*, as anything other than gas—50 p.ct. (22·5 out of 45) are delivered as gas to the consumer.
5. In the gas-works of the future it is possible that coal will be as completely as possible gasified, and that 75 heat units out of every 100 in the coal treated will be available for distribution as gas, as against 18 out of 100 available if the distribution be in the form of electric energy.
6. After allowing in both cases for all losses in transmission and utilization—that is, after giving electricity credit for its

somewhat higher "efficiency of utilization" than gas—there would be involved in the doing of equal heat work for the consumer the using-up of 4 tons of coal at the electric generating station of to-day, as compared with 1 ton at the gas-works of to-day; or 3 tons at the super-station of the future, as against 1 ton at the gas-works of the future.

7. To give the gas consumers of to-day equal service to that rendered them for a consumption (net) of 10 million tons of coal (*i.e.*, 20 million tons carbonized, *less* 10 million tons of coke sold), the electric generating stations of to-day would destroy 40 million tons and the "super" stations 20 million tons at least—and in so doing would destroy all the valuable bye-products of coal carbonization.

8. To displace by gas the 40 million tons of coal now used for domestic fuel (these are figures deduced from Sir Dugald Clerk's data and the Coal Controller's estimated gas equivalent of coal for fuel purposes), a net destruction of only 30 million tons would be involved if gas carbonized at the works of to-day were used; whereas if electric energy were employed, 120 million tons would be destroyed at the generating stations of to-day, or 60 million tons at the super-stations if they proved as economical in coal consumption as promised.

Relative Fuel Cost.

How do the cases stand for the use respectively of (1) gaseous fuel, (2) crude coal, and (3) electricity from the individual consumer's point of view?

First of all, it is necessary to point out and to emphasize strongly the fact that in considering this aspect of the question we must not merely have regard to fuel cost compared with fuel cost, but take into consideration the domestic or industrial budget as a whole—the questions of waste or economy of transport, health, energy, time, storage space, &c., to which I have already referred—before we can pass a final verdict as to comparative costs.

For continuous firing, either for industrial or for domestic purposes, fuel cost for fuel cost, gas at any price at which it can be commercially supplied to day is dearer than coal or coke. For intermittent use, gas is generally as cheap, fuel cost for fuel cost—is sometimes actually cheaper—and by reason of its incidental economies easily holds the field.

The following I believe to be reliable comparisons of the cost (the fuel cost only) of useful heat to the consumer obtained from coal, coke, gas, and electricity. I have taken coal and coke at 50s. per ton, gas at 8d. per therm, which is equal to 100,000 B.Th.U. and is the quantity of heat contained in 200 c.ft. of 500 B.Th.U. gas (an average quality); and electricity at 2d. per unit.

	Per Therm or Useful Heating.*
Coal (50s. per ton) . . . . . costs from	9d. to 27d. (*a*)
Coke (50s. per ton) . . . . . ,, ,,	8d. to 12d. (*b*)
Gas (8d. per therm) . . . . . ,, ,,	10d. to 18d. (*c*)
Electricity (2d. per unit) . . . . . ,, ,,	60d. to 80d. (*c*)

* Heat that does useful work for the user, as distinct from that wasted through the inefficiency of utilization or through the unavoidable burning of fuel at times when heat is not needed.
(*a*) According to whether required for regular or intermittent heating.
(*b*) Only comparable in cases where fairly constant heating required.
(*c*) According to efficiency of utilization, varying in different processes.

The substitution of gas for coal in industrial processes frequently results in the saving of so much in stoker's wages and incidental expenses as to effect a substantial economy to the user, in spite of the cost of the gas consumed being greater than that of the coal formerly burned. I understand that the cooking at the British Empire Exhibition is all being done by gas, including the use of many surface combustion radiophragms for grilling purposes. Again, the use of gas in industrial processes, by reason of the maintenance of constant temperature and the possibility of exact heat regulation, frequently leads to a higher and more uniform quality of product, a much lower percentage of rejects, and a greater certainty of output. Moreover, it frequently results in an increased output per machine per hour, and furthermore secures healthier and less exhausting conditions for the employees.

Mr. GOODENOUGH, in presenting the paper, said: The purpose of the paper which I have had the honour to present to this conference is rather to emphasize the necessity for a definition when you are using the word "power" as applied to this conference. The study of power is, of course, most important in industry to-day, and this conference is for the study of how the two forms of power—human energy and material energy—can best be utilized, and the extent to which material energy can replace human energy. Our only source of mechanical energy in this country, practically speaking, is coal; and the potential energy of coal can be used to produce either light or heat (for fuel purposes, for motive power purposes, and for mechanical energy). Heat and motive power are apparently grouped together and used almost as synonymous terms by the organizers of the conference, when they speak of world power; but a very great distinction is to be drawn between the two purposes for which coal energy can be used—namely, that for heat and that for motive power.

The use of the energy of coal in the form of heat has a bearing upon the human power problem, both in industry and in the home, by abolishing or reducing the labour involved in stocking and in the other processes involved in the handling and utilization of solid fuel; and on this point I would just say, in reply to our friend Mr. Brownlie, that the important thing is to take the budget as a whole, both in the home and in industry, and not merely to take fuel costs. If cost per therm were the sole and deciding consideration in either industry or home, Sir Arthur Duckham's paper could not have been presented; but when Mr. Brownlie gives us all his wonderful arguments to show that it is impossible to use gas for industrial fuel purposes, we just point to Sir Arthur's paper and say: "That is what is being done by hard-headed business men, and is being done continuously all over the country—namely, the displacement of solid fuel by gas—because of the many incidental advantages attending its use, and sometimes even the actual fuel cost advantage, for, contrary to the confident opinion expressed by Mr. Brownlie, coal can be wasted."

When you come to decide what is the right way in which to utilize the potential energy of coal, there are three considerations to take into account. The questions of conservation or otherwise of national wealth and national health, and the question of the economy to the consumer in a particular application. You can prove as clearly as you like that a particular way of using coal or its product is best for the national wealth and health; but if you cannot demonstrate to the consumer that it is best for him, you very often leave him cold and unpersuaded. So far as the application of the potential energy of coal to light and the production of motive power is concerned, as Sir Dugald Clerk has said, in the one case there is no difference between gas and electricity from the point of view of thermal efficiency. For motive power the balance is slightly in favour of gas, but there is no great difference. It is when you come to the use of the potential energy of coal as a fuel, either in the home or in industry, that the balance goes down heavily in favour of gas; and at the same time, so far as the chemical conservation of energy is concerned, it is wholly in favour of carbonization, as the process of direct combustion means the complete waste of the chemical bye-products of carbonization.

It is for the reasons I have briefly outlined, and set forth fully in my paper, that we believe that gas for heat wins the case all the way round. So far as space saving, smoke saving, and labour saving are concerned, the cases for gas and electricity are the same; but from the point of view of coal saving, chemical saving, and last, but by no means least, so far as money saving to the consumer is concerned, gas as a fuel holds the field absolutely as against electrical energy. We believe gas is the fuel of the future, with coke as an alternative for constant firing on a large scale. Mr. Nicol has said all there is to be said in this connection, and we as an industry, are glad to feel we can contribute to the study of the power problem the assurance that the gas-works can provide the smokeless fuel of the future, in the form of either gas or coke, and that before long the use of solid fuel producing smoke will be unknown, because it will have been proved unnecessary from the consumers' and from the nation's point of view.

Discussion.

Mr. F. S. SINNATT said attention was called to the use of gas and coke, &c., but there was really another very big problem from the national point of view, and that was, could the gas industry and other industries use coals which contained much greater impurities? Were they prepared to deal with coal which was impure? Coal was a natural product, and they had been using as a nation their pure products. The future lay with the utilization of coals which were less pure. They would turn quite rightly to the coal industry, and ask for pure coal. That industry was perhaps not developed as it should be in its purification system. So they were faced with the use of coal not so pure as they had been accustomed to. What did that mean? The coal industry must have new means of purifying coal; and he wished to say seriously that if the coal industry was to sell 37 million tons of coal per annum to the gas-making industry or the low-temperature carbonization industry, which at present it was selling to the public as household coal, a very serious problem was going to arise. It might mean that the coal would have to be handled in some new manner; and it was part of the work of this big conference to visualize what was going to happen to the nation's coal if all these beautiful ideas about carbonization became real. This was a problem which had been rather ignored in this World Power Conference—coal *qua* coal had been ignored.

Dr. R. LESSING remarked that the point raised by Mr. Sinnatt was very important. He was afraid that in the past coal had been regarded as coal, and nothing else. Even those of them who made a study of coal and the products obtained from it were in a fog of ignorance about what this material really was. They were talking of economic conditions, and it was the only right way of looking at the problem from the national point of view in each country. The mere advantages of one process over another had a very small circle of interest, and might mean nothing compared with the enormous question before them. They knew very little about coal, and until they learned a great deal more he was afraid that much of the technical work that was being done on the utilization of coal was performed in such a round-about way that a considerable part of the intrinsic value of the coal was lost. Mr. Nicol had raised a point about pulverized coal—that a tremendous impediment to its use was the disposal of the ashes. But this could be cited not only against powdered coal. The gas industry was hampered by the amount of inert material delivered from the colliery in exactly the same way. The collieries did not know to-day how to deal with the subject. They did up to a certain point, but so far as coal washing methods and the preparation of coal were concerned, they did not go far enough. Coal was required of much higher purity. In some coals 60 to 80 p.ct. of the material, if not free from ash, did not contain more than 1 to 1·5 p.ct. The balance of the total ash contained in coal—which went up to 7 or 10 p.ct. in a comparatively good one, and to 15 to 20 p.ct. in the case of slack—was found either in a comparatively small quantity of coal constituents or else it was admixed ash which had nothing to do with coal whatever. It was therefore a

matter of how to tackle the research on coal in such a way as to get to the bottom of the question, and find out how the coal should be treated so as to be suitable for the highly refined methods of its application in any direction. As a matter of fact, in these methods of carbonizing it was of the utmost importance to know what the impurities in the coal were, because recent work had shown that, according to the distribution and chemical composition of the ash, &c., carbonizing results at high or low temperatures might differ very considerably. He therefore wished to enter a plea for the study of the raw material with which they were dealing, before it was too late for the study to be of any avail.

Mr. FRANK H. JONES said that to those of them who used large quantities of coal, the question of carrying a big amount of inert matter, and also putting it through their coal stores and the process of carbonization, was very serious. There was, however, work being done in this connection, and his belief was that in a comparatively short time they would not be foolish enough to put a lot of inert stuff through their retorts. Whether they would treat the coal themselves or get the collieries to do it, was a moot point, but personally he thought some of the collieries were making efforts not to send down ship-loads and train-loads of rubbish. Many people would tell you this; but if the collieries did not make an effort, it was up to gas-works and other large users of coal to see that they did not pay carriage on inert matter, labour expenses in the works, and wear and tear of plant trying to carbonize rubbish. It was one of the most urgent points, because the price of gas could be much reduced in all places if only they could get coal as they would like to get it, as they ought to get it, and, as he thought, they could get it.

The CHAIRMAN, before the delegates dispersed for luncheon, said he would like to call attention to an exhibit in the hall arranged by Sir Robert Hadfield, who was very sorry he could not be present. It dealt with fuel economy and the measurement of high temperatures. The President of the Société Technique de l'Industrie du Gaz en France was very sorry he was not able to be with them, but had sent a delegate.

(To be continued.)

London County Council and Standard Gas Prices.

Reporting on the steps taken by the London County Council to secure a reduction of the standard price applicable to the Commercial Gas Company, the Public Control Committee point out that the Board of Trade have now made an Amending Order [*ante*, p. 262] which provides that, as from June 30, 1924, the standard price of gas for the Company shall be reduced from 15·4d. to 11·4d. per therm. The new standard price is slightly less than the mean between the respective figures suggested by the Council and the Company. While pointing out that the result of the Order will be that the dividend which the Company will be entitled to pay will be substantially reduced, the Committee add that the Company have anticipated the effect of a reduction of standard price by voluntarily reducing the actual price charged and restricting their dividends; the dividend paid for the year 1923 on both of the Company's stocks being 6 p.ct. Dividends were paid in 1913 and 1914 on the 4 p.ct. (the principal) stock at the rate of £5 9s. 4d. p.ct. per annum, and on the 3½ p.ct. stock at the rate of £5 6s. 8d. p ct. per annum. The corresponding rates of dividend which, with gas at its present price, the Company would be entitled to pay under the new Order are £5 14s. 8d. for the 4 p.ct. stock and £5 13s. 4d. for the 3½ p.ct. stock. This increase of dividends over the pre-war figures represents an amount which is equivalent to only 0·08d. a therm. The Committee conclude: "As pointed out in our report of Feb. 12 last, the South Metropolitan Gas Company are not at present subject to the Gas Regulation Act, 1920, as regards standard price, but we still have under consideration the question of the action to be taken with a view to securing a revision of the standard price applicable to the three remaining Companies supplying gas in the London area—viz., the Wandsworth, Wimbledon, and Epsom District Gas Company, the Brentford Gas Company, and the South Suburban Gas Company."

Mansfield Gas Undertaking.—Some interesting details were given at a meeting of the Mansfield Town Council last Friday respecting the successful working of the gas undertaking for the year ended March 31. The meters fixed in the area supplied number 9108 prepayment and 2332 ordinary—an increase of 181 over the previous year. The quantity of coal used was 17,600 tons. The make of gas per ton of coal carbonized was 11,966 c.ft., compared with 11,923 c.ft. last year. The consumption of gas was 189,512,900 c.ft., against 183,675,300 in 1923. The total income for 1924 was £63,911, compared with £63,757 for 1923, and the expenditures for the respective periods were £48,253 and £47,282. The net profit for 1924 was £6043, and for 1923 £6282, notwithstanding a reduction of 4d. per 1000 c.ft. in July, 1923. The gross profit was about 10·2 p.ct. on the capital expenditure of the works.

Gas-Works Fatality.—An inquest was held at Moretonhampstead last Wednesday on Albert Pitman, aged 72, who had been employed at the Moretonhampstead Gas-Works for many years, and met with a fatal accident on June 21. Walter Wright, foreman in charge of the works, said deceased was working at the furnace and raking out the fires on the morning when the accident occurred. Witness was not far away, and heard Pitman call out. He went to his assistance and got him up out of the subway. Witness gave as his opinion that the accident was caused by the slipping of a bar, but admitted this was the first time in his experience that a bar had slipped. Replying to the Inspector of Factories, he said Pitman was a good workman, and had been doing this particular job for forty years. A medical man stated that Pitman was suffering from burns and scalds on both arms and the whole of the face and ears, and a dislocation of the left shoulder. The Coroner recorded a verdict of "accidental death," and expressed his deep sympathy with the relatives, with which Mr. George Lane (Secretary of the Devon Gas Association) said his Directors desired to be associated.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

The Regenerative Coal Gasification System.

SIR,—In a letter published in your issue of July 16, Mr. F. D. Marshall states that the Travers and Clark process for the complete gasification of coal and the Naef process described in the British Patent Specification No. 20,659 of 1899 "are as like as two peas." He supports this statement by a diagram with descriptive matter attached, and at the end of the latter are the words: "The diagram is a faithful copy of Naef's specification."

Had this been the case, and had the descriptive matter been in accordance with Naef's specification, we should have taken no notice of the matter; but the drawing is incorrect, and the descriptive matter distorts the fact to such an extent as to make it appear that there is a certain similarity between the two processes. The drawing shows the vessels A and B to be continuous, while in Naef's specification they are shown to be separated by a valve or shutter, which must be gas-tight, for unless this is the case the process cannot be operated in the manner described.

The descriptive matter is not specifically stated to be a faithful rendering of Naef's specification, but in the circumstances, and particularly as Mr. Marshall has been nursing his discovery for some weeks, it might have been assumed that he had studied Naef's work, and could not fall, by accident, into serious error in describing it. He refers to the vessel B as a "water-gas generator." Naef refers to the vessel B as a "gas-producer," and as it is fed with coke, and supplied with air, but with no steam, the gas generated in it can contain no hydrogen, and by no stretch of imagination can it be called "water gas." In law, water gas, and the gas produced by the combined action of air and steam on coal, are in some cases liable to confusion. Water gas generated without water or steam is simply an unthinkable proposition. The producer gas is burned in the heater C. Naef's specification describes the vessel A as the "water-gas generator," but Mr. Marshall, having diverted this term to the description of the vessel B, which Naef calls the "gas producer," must find a new name for it. He calls it the "coal container."

It may be inferred from Mr. Marshall's description that the water gas generated in B is circulated through the vessel A, after passing through the heater C. However, no water gas is generated in B. Actually, in Naef's process, water gas is supposed to be generated by circulating a mixture of gas "with large excess of steam" through the heater C and the water-gas generator A. Nothing of the kind is suggested or attempted in the Travers and Clark process.

In conclusion, we may add that we have been acquainted with Naef's work since we commenced our investigations on complete gasification. As a matter of fact, Naef's specification No. 20,659, 1899, was cited by the Controller of the Patent Office, but it was not considered that it anticipated our invention in any way.

REGENERATIVE COAL GASIFICATION SYSTEM, LTD.
W. M. Travers, Director.

147, *Queen Victoria Street, London, E.C.* 4,
July 18, 1924.

Rotary Meters and their Measurement.

SIR,—I have read with great interest Mr. Gibson's paper on the "Construction of New Coal Gas-Works at Garston," and also the discussion. I was particularly interested in the references to rotary meters made by Mr. Gibson in his paper and Dr. A. Parker in the discussion. Their kindly allusions to the rotary meter are much appreciated, and I would at once say that their remarks are statements of fact; but I should not like gas engineers to think that the rotary meter is only correct when measuring at its rated capacity.

Rotary meters are correct at all rates of flow from the rated capacity down to one-tenth of same—that is to say, a meter with a maximum capacity of 100,000 c.ft. per hour would be correct at any rate of flow from 10,000 c.ft. per hour up to 100,000 c.ft. per hour. We are prepared to demonstrate this at any time at our Manchester works, where special arrangements have been made for testing.

Dr. Parker has made quite a fair criticism of the rotary meter when using dirty gas, and raises a point which has been of great concern to all makers of meters; but it is interesting to note that our new patent for the spraying of meters *in situ* overcomes the difficulty mentioned, and we can now supply meters which are arranged to measure gas of even the character mentioned by Dr. Parker.

FRANKLIN THORP, Director,
ROTARY METER COMPANY, LTD.

Talbot Road, Stretford, Manchester, July 16, 1924.

The French Centenary of Gas Supply.

SIR,—The enclosed from M. Rouland and M. Mougin, President and General Secretary of the Centenaire de l'Industrie du Gaz en France et Cinquantenaire de la Société Technique de l'Industrie du Gaz will probably be of interest to the members of our Institution.

It will be observed that the friendly relations existing are fully reciprocated by our French confrères.

The cordial relationship between Great Britain and France can be strengthened in no better way than by cultivating friendships between those engaged in kindred industries in both countries; and I hope it will be possible to promote a permanent international co-operation of our respective professional organizations.

J. FERGUSON BELL.

Derby, July 15, 1924.

Mr. J. Ferguson Bell,
Président de l'Institution of Gas Engineers,
The Gables, Derby.

Monsieur le Président,

J'ai été vivement touché des sentiments amicaux que vous avez bien voulu m'exprémer par votre lettre du 4 juillet dernier, et suis très

heureux de l'agréable souvenir que vous avez emporté des Fêtes du Cinquantenaire de la Société Technique et du Centenaire de l'Industrie du Gaz en France.

Je suis persuadé que la collaboration dans toutes les branches de l'industrie entre les diverses nations alliées et amies qui ont combattu côte à côte sur le champ de bataille de la Grande Guerre contribuera à affermir et établir un régime d'ordre et de paix sans lequel aucun travail fructueux n'est possible.

Je vous sais gré de vos voeux de succès pour l'Industrie du Gaz en France, et je vous prie d'agréer, pour vous-même et d'accepter pour vos collègues de l'Institution of Gas Engineers le salut confraternal de la Société Technique.

Veuillez agréer, Monsieur le Président, l'assurance de mes sentiments très distingués.

F. Rouland,
Président du Comité du Centenaire.

[TRANSLATION.]

DEAR MR. PRESIDENT,—I was extremely touched by the friendly sentiments which you expressed to me in your letter of July 4 last, and I am very pleased with the agreeable remembrances which you have carried away of the celebrations of the Jubilee of the Société Technique and the Centenary of the Gas Industry in France.

I am persuaded that the collaboration in all branches of the industry between the various allied and friendly nations who fought side by side on the field of battle in the Great War will contribute to strengthen and establish the order and peace without which fruitful work is impossible.

I am well pleased with your wishes of success for the gas industry in France, and beg you to accept for yourself and for your colleagues of the Institution of Gas Engineers the brotherly salutation of the Société Technique.

Monsieur le Président,

J'ai l'honneur de vous accuser réception de votre très aimable lettre par laquelle vous voulez bien me remercier pour la façon dont nous avons recu à Paris les membres de l'Institution of Gas Engineers.

J'ai déjà eu plusieurs fois l'occasion d'aller en Angleterre, d'y être recu par des gaziers, et je n'ai eu pour préparer cette organisation qu'à me souvenir de l'accueil que j'avais toujours reçu chez vous.

Je suis très heureux si vous avez emporté un bon souvenir des quelques journées trop courtes que vous avez passées en France.

Je vous prie d'agréer, Monsieur le Président, avec tous mes remerciements pour votre très aimable pensée, l'expression de ma considération la plus distinguée.

T. Mougin,
Le Secretaire General.

[TRANSLATION.]

DEAR MR. PRESIDENT,—I have the honour to acknowledge receipt of the very cordial letter in which you so kindly thank me for the manner in which we received the members of the Institution of Gas Engineers when they visited Paris.

I have already been fortunate enough to visit England several times, and to be received there by gas engineers; and the remembrance of the warm welcome which has always awaited me was sufficient to inspire the welcome given to you.

I am extremely glad if you have carried away a happy memory of the few days—too short—which you spent in France. I ask you to accept, Mr. President, with warmest thanks for your letter, my kindest regards.

Heathfield and Waldron Prospectus.

Regarding the invitation of the Heathfield and Waldron Gas Company for tenders for some thousands of pounds of new capital, a correspondent points out that the following figures regarding the Company appear in the Board of Trade Returns:

	Gas Made. 1000 C.Ft.	Gas Sold. 1000 C.Ft.	No. of Consumers.
1919	5784 ..	5382 ..	263
1920	6200 ..	5807 ..	266
1921	5719 ..	5319 ..	278
1922	5863 (= 28,729 therms) ..	5120 (= 25,088 therms) ..	307
1923	Figures not yet published.		

The revenue, capital, &c., can also be found in the Finance and Prices part of the "Returns." The figures show the impudence of the people who issued the prospectus.

California's Enviable Record.

The United States Department of Labour, in a recent report, presented figures showing now-prevailing price levels for various commodities as compared with the pre-war period. These figures indicate that since the pre-war period food has risen 44 p.ct., rent 63 p.ct., clothing 75 p.ct., fuel 81 p.ct., and furniture 122 p.ct. The average increase in the necessities of life is given at 70 p.ct. Concerning the part of the report which deals with fuel prices, the men of the gas industry upon the Pacific Coast have something to say. Mr. Clifford Johnstone, Assistant Secretary of the Pacific Coast Gas Association, whose headquarters are in San Francisco, claims that in this particular California presents an enviable record. "As a matter of fact," he says, "the average rate for gas before the war throughout California was 66 cents per 1000 c.ft., while the average rate paid during 1923 was 52.8 cents, a decrease of approximately 20 p.ct. These California figures include the total sales of gas by California utilities. The decrease over pre-war conditions has been made possible by the enormous increase in the use of gas for fuel by California industries, many of which use gas exclusively because of its lower cost, greater convenience, and adaptability to regulation."

REGISTER OF PATENTS.

Distillation of Fuels.—No. 217,041.

THE FUEL RECOVERY SYNDICATE, LTD., and BOWATER, N. J., both of Westminster.

No. 14,710; June, 5, 1923.

This invention relates to an improved method of, and apparatus for, the distillation of carbonaceous fuels, where the fuel is heated by being brought into direct contact with superheated low-pressure steam in or without the presence of other gases; the distillation being accomplished by means of the sensible heat thereof. In this system it is impossible to utilize the latent heat of the steam within the retort itself for the distillation process. Consequently in order to maintain the efficiency of the process, it is of the greatest importance to recover this latent heat. According to the present invention, the gas and steam leaving the distillation apparatus is cooled by means of water. This water condenses the volatile tars and oils, as well as the steam, and in so doing takes up their latent heat as well as their remaining sensible heat. The water thus heated is then passed through a known saturating means through which a quantity of a suitable gas is also passed in direct contact with, but countercurrent-wise to, the heated water, and becomes saturated to such a temperature that it takes up the necessary quantity of water vapour, which, when superheated to the required temperature, suffices for the distillation of the fuels. The efficiency of the process may further be increased by recovering and utilizing the sensible heat of the fuels as they leave the retort or other distillation apparatus.

The invention also includes apparatus comprising in combination a distillation apparatus or retort, a superheater for raising the steam and other gases present to the necessary temperature for distilling the fuel or like material, a cooler for cooling the gas and condensing the steam and distillates by means of water, a saturator for saturating with water vapour the gas by means of the hot water from the cooler, means for circulating the water from the cooler to the saturator and from the latter back to the cooler, and means for causing the gas to pass through the saturator, and the gas and steam from the latter, through the superheater and through the retort to the cooler, as well as means to take up the sensible heat of the fuel before it leaves the retort.

Rotary Retorts.—No. 217,428.

HEYL, G. E., of Westminster.

No. 16,691; June 27, 1923.

This invention relates to rotary retorts for the distillation of solid hydrocarbons; and its object is to provide a rotary retort in which, by virtue of the perfection of heat transfer, the fine degree of subdivision, and, with fixed materials, the intimacy of admixture of the material treated, the retorting period is considerably shortened as compared with that required with ordinary rotary retorts. For this purpose, a tubular rotary retort is so internally strengthened (for instance, by the provision of a stout steel-plate lining) as to contain loose heavy metal balls or masses of metal to grind the material by their impact and friction during the rotation of the retort. The invention may therefore be considered as a rotary retort modified to act as a tube mill.

In such apparatus, the grinding or the final stage of grinding of the solid material takes place simultaneously with the distillation. Also the heat due to friction is utilized in supporting the distillation temperature and, what is of more importance, the grinding balls or the like transfer the heat from the walls of the cylindrical body of the apparatus uniformly to the material undergoing distillation, besides intimately mixing the ground particles thereof. The result, claims the patentee, is a considerable abridgment of the period of time necessary for affecting distillation as compared with ordinary rotary retorts.

The material may be admitted at one end of the retort by the usual screw conveyor, the casing of which is somewhat convergent closely to pack the material and effectively to seal the inlet. At the delivery end the residual material may discharge into the usual hopper at the lower side of an end cover having an annular gas-tight seating against the end of the rotary cylindrical body of the retort, the lower end of the hopper being closed by a rotary radially chambered valve. The cylindrical body of the retort may be transversely divided at intervals by perforated partitions or by inwardly directed radial flanges, through which or over which the ground material can pass, but which hold back the grinding balls or the like. The external heating flues may be so arranged that different temperatures are definitely maintained in the several compartments or zones of the retort formed by the partitions, as distinguished from the usual gradual progressive increase and decrease of temperature along the retort, which latter arrangement may, however, be adopted.

Globes for Incandescent Burners.—No. 217,449.

JONES, A. C., and STUBBS, S. P., both of Birmingham.

No. 18,023; July 12, 1923.

This invention relates to the bowl-like globes, shades, or reflectors which are combined with incandescent gas burners to obtain obscured or indirect lighting. Owing to the mantles becoming damaged, the globes are liable to fracture due to the flame issuing from the damaged mantle, and in practice the part of the shade most liable to fracture or other damage from such cause is the lower central portion. This invention consists in making this part of the shade separate from the upper or main part, and fitting it thereto in such a manner that, should fracture or other damage of the lower central portion occur, this part can be readily removed and replaced by a corresponding new part; and thus the expense which would attend the replacement by a complete globe is considerably minimized. Further, the invention provides the advantage that the lower central section, instead of being made of ordinary glass like the main part may, if desired, be made from silica,

&c., while the main part may be of glass of ordinary composition and quality. Thus the expense of a complete article of silica is avoided, while some measure of the durability provided by the fracture-resisting qualities of this material is obtained.

The invention may be carried into effect in various ways; and in its simplest form the globe, which as a whole has a more or less bowl-like contour, is made in two parts capable of ready separation—the upper or main part being of annular formation. The lower open end of the main part is of smaller diameter than the upper open end, and its marginal part or rim is inwardly, and preferably slightly upwardly, turned to provide an annular seat for the lower central section of the globe. The latter is constituted by a convex or dished or hemispherical bowl-like part, the major portion of which is of a diameter proper to permit it to pass through the lower open end of the upper part of the globe, while its open end or rim, which is outwardly turned and preferably slightly downwardly curved, has such a diameter that it will pass through the upper open end of the main part, but will not pass through the lower opening but will engage with the seat provided by the inwardly turned rim at the lower open end of the upper or main part. The engaging rims of the separable parts described may be provided, if desired, with inter-engaging or interlocking parts to prevent inadvertent displacement.

A further advantage arising from the two-part construction is that an appreciable amount of air gains access to the bowl at the junction of the two parts thereof, and serves to ventilate it. The amount of ventilation at this part may be considerably increased by so forming the interlocking or inter-engaging parts of the rims that the seating between the two parts is non-continuous.

Distillation of Ammoniacal Liquor.—No. 217,611.

SOUTH METROPOLITAN GAS COMPANY, PARRISH, P., and WEIGHT, O. W., all of London.

No. 34,479; Dec. 18, 1922.

The primary object of this invention is to utilize more completely the heat available in the distillation system of the present types of sulphate of ammonia plants. With this object, a multiple distillation plant, each unit of which comprises a still and a saturator of known character, with several units connected in a series, is used for depriving the liquor of its volatile or free ammonia content before it passes to a liming chamber; thereby avoiding the disadvantages arising from the interaction of carbon dioxide and lime in multiple unit stills designed for the concurrent removal of the free and fixed ammonia. The discrimination between "limed" and "unlimed" liquor is an essential feature of the invention. The permanent gases pass with the steam from the saturator of each unit to the next free still, the liquor from the free stills being led to a liming chamber associated with a separate still where the fixed ammonia is eliminated. To minimize the resistance to the flow of gases, a distillation unit of the non-sealed type may be adopted, so as to obviate the formation of undue pressure and dispense with the necessity for a vacuum pump.

Gas from Powdered Fuel.—No. 217,645.

DUFFIELD, F. L., of Brassington.

No. 7836; March 19, 1923

The method of producing gas in the apparatus according to this invention consists in conveying powdered carbonaceous matter, air, and steam into a generator, subjecting these to gasification and circulation within the generator, withdrawing the carbonaceous matter, air, and steam from the generator, and re-introducing them at a high velocity; and apparatus comprising means for doing this efficiently.

An apparatus made in accordance with this invention comprises a receptacle or generator of conoidal form of cast steel or refractory material mounted in a setting, an air jacket or space or flues between the generator and the setting, and an aperture at the base through which the ash and inert matter falls into a water trough in which is disposed a conveyor for removing the ash. Steam rising from the trough enters the generator. In the side of the generator, and tangentially disposed, are nozzles through which powdered fuel and air are introduced. At or near the bottom of the generator is an outlet through which steam and gases are drawn and returned to the generator tangentially at or near the top, to sustain the circulation of the fuel and gases to allow time for the formation of the desired products. At the top is an outlet for the products leading into a spiral or other flue from which they are led away for use. Air is circulated in the jacket round the generator, thereby absorbing radiant heat, and is led away for use with the gases.

In use, peat, lignite, charcoal, or coal in powdered form, containing a small or larger proportion of inert matter, is carried with the minimum quantity of air tangentially into the generator, which is maintained at a temperature of about 900° to 1000° C. by the gasification of the pulverized material; the latter being caused to circulate round the inside surface of the generator until the non-combustible matter gradually descending in its circulation is at last precipitated into the water bed at the bottom of the generator, while the carbon and volatiles in the pulverized material are burned into gas in a reducing atmosphere with an excess of carbon. The circulation of the pulverized material affords the necessary time factor for intimate combustion to effect the production of gas rich in carbon monoxide and hydrogen. The secondary air necessary to cause the combustion of the gases into CO_2 is circulated by a fan round the air jacket of the generator, thus protecting the cast steel or refractory lining from destruction by excessive heat and at the same time utilizing the radiation therefrom for conveyance into the furnace or other combustion chamber where the fuel is to be employed. The hot ash dropping into the water trough facilitates the production of steam; and for the purpose of bringing the steam into intimate contact with the combustibles circulating in the generator, and in order to sustain such circulation, the air and steam are drawn at low velocity from the interior of the generator and are emitted at high velocity round the sides of the generator in the direction of the already revolving pulverized material.

Gas-Heated Appliances.—No. 217,701.

FENELEY, C., and ROSS, J. H., both of Southampton.

No. 10,758; April 20, 1923.

This invention refers to gas-heated appliances such as stoves, geysers, &c., and has for its object to eliminate the possibility of the products of combustion entering the room. The air for combustion is drawn from outside the apartment, and conducted through a pipe which terminates in close proximity to the end of the flue pipe carrying away the products of combustion. Thus the atmospheric pressure at that point is balanced, though the spent gases are not allowed to gain entry to the fresh air pipe. The flue pipe is constructed sufficiently large to contain within its end the fresh air pipe. The latter has secured at its end a deflector cone, the opening being above this. The end of the flue pipe is below this cone, leaving an annular space for the escape of the burnt gases, which are deflected in a downward direction,

Gas Burners.—No. 217,771.

RADIATION LIMITED, of Birmingham, BRAYSHAW, S. N., and BRAYSHAW, E. R., of Manchester.

No. 16,799; June 28, 1923.

This invention relates to atmospheric gas burners primarily intended for bakers' ovens, though applicable to other purposes. It comprises two concentric tubes with an annular chamber between; the inner tube being fitted with a series of holes, and the outer tube with a number of slits. The venturi throat through which the gas and air enter is connected with the inner tube by an elbow joint, and engages with an aligning bracket from which it can be disengaged so that the venturi throat and the burner tubes can be placed in position or removed from the oven without breaking any gas joints or connections; the gas supply jet being carried by the aligning bracket.

Gas Ovens.—No. 217,806.

WATSON, A. G., of Birmingham.

No. 22,400; Sept. 6, 1923.

The object of this invention is to provide means for economizing gas consumption and dissipating any obnoxious fumes, and relates to an independent device which can be fitted to an ordinary gas oven without involving any structural alteration or departure from existing design. It consists of the provision in a gas oven of a separable sheet metal hollow lining adapted to fit within and to abut the sides of the oven. This lining has apertures formed in the upper section of its inner walls to admit of the passage of the heated gases from the oven to the interior of the lining; means being provided for disposing of the products of combustion and for drawing off any condensation products. The lining is made from a metal which has a good coefficient of conductivity.

Gasholders.—No. 217,840.

MARKS, E. C. R., of London.

No. 29,515; Nov. 22, 1923.

[A communication from Maschenenfabrik Augsburg-Nurnberg A. G., of Nurnberg.]

This invention relates to the foundations of gasholders, in particular holders of the dry type. Dry gasholders can only withstand subsidences of the ground to a very slight extent; and the object of the invention is to provide means by which any defect due to subsidence can be remedied easily without affecting the stability of the holder. The latter is erected on a baseplate of concrete intended to carry the inner useful load of the holder. This plate rests at its circumference on an annular foundation of concrete, which ring is intended to carry the weight of the holder and also to take up the forces set up by wind pressure. A separating layer is riveted between the plate and the foundation ring in order to prevent the plate from sticking to the ring. The baseplate and ring are detachably connected, and lifting devices are provided at certain intervals round the circumference of the ring, by means of which the baseplate together with the holder is lifted, in the case of subsidence, only at the required points; the clearance being filled with concrete.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for July 16.]

Nos. 16,224 to 16,805.

BRITISH THOMSON-HOUSTON CO., LTD.—"Gas-burners." No. 16,714.

DUFFIELD, F. L.—"Producing gas from powdered carbonaceous matter." No. 16,598.

GRAY, C.—"Sectional pipe lines, and means for jointing sections thereof." No. 16,618.

HELPS, G.—"Gas cookers and ovens." No. 16,435.

KLÖTZER, H. M.—"Method of recovering combustible gases from fuel." No. 16,480.

KOHLENSCHEIDUNGS GES.—"Rotary drums for distillation of coal, &c." No. 16,708.

KOHLENSCHEIDUNGS GES.—"Production of fuel from semi-coke." No. 16,709.

MARKS, E. C. R.—See Kohlenscheidungs Ges. Nos. 16,708, 16,709.

PEASE AND PARTNERS, LTD.—"Recovery of pyridine, &c., from bye-products." No. 16,283.

ROBINSON, R. L.—See Pease and Partners, Ltd. No. 16,283.

STRÖM. O.—"Apparatus for laying pipes." No. 16,415.

WESTWOOD, W. W. S.—"Gasholders." No. 16,224.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Companies Amendment (Co-partnership) Bill.

This Bill was considered by the House in Committee on the 15th inst., and amendments were made. The amendments were reported on Thursday, and the Bill will be read the third time on Monday next.

Public Health (Smoke Abatement) Bill.

The second reading of this Bill was agreed to after debate; and it is to be considered by the House in Committee on the 28th inst.

HOUSE OF COMMONS.

A petition has been deposited by the Bedwellty Urban District Council against the Rhymney and Aber Gas Bill.

Gas Regulation Act.

On the motion of Mr. Albert Alexander last Monday week, it was ordered that the draft of a Special Order relating to the Pinner Gas Company, Ltd., should be referred to a Select Committee, and that if no Statement of Objection had been deposited in the specified time the reference to the Select Committee should be discharged.

Carbon Monoxide in Public Gas Supplies.

On the 14th inst., a copy was presented (by command) of a report to the Board of Trade by Mr. W. J. A. Butterfield, M.A., F.I.C. (one of the Gas Referees), with correspondence arising thereon.

LONDON COUNTY COUNCIL (LAMBETH BRIDGE) BILL.

This Bill has been occupying the attention of a Committee of the House of Commons, presided over by Sir JOHN BRUNNER, during the last fortnight. The London County Council propose to build a new bridge over the Thames at Lambeth, to replace the existing bridge, which is unsafe for traffic. When the Bill was in the House of Lords, the Gas Light and Coke Company opposed with regard to carrying mains across the new bridge, and secured the continuation of their existing facilities in this connection (see the "JOURNAL" for April 16, p. 188). On the present occasion, however, there was opposition from the Wandsworth, Wimbledon, and Epsom Gas Company, the South Metropolitan Gas Company, and the Gas Light and Coke Company; but it concerned the construction of the bridge. It was alleged that if the present scheme were carried through, the bridge would hamper navigation generally, and their own coal vessels in particular.

The Wandsworth Company ship their coal from the north of England direct to their works, which are above Lambeth Bridge, in colliers of from 1350 to 1800 tons dead-weight cargo; and the Company say that, of the five arches of the proposed bridge, their steamers would only be able to navigate the central one, which would be dangerous in this congested part of the river. The Bill, as originally deposited, provided for a height of 20 ft. above Trinity high-water mark at the centre of the central arch, and 15 ft. 8 in. at the arches on either side of the centre; but in the House of Lords, where the Port of London Authority opposed, these heights were increased to 21 ft. and 16 ft. 8 in. respectively. The Company now ask that the headway at the side arches should be increased to 19 ft.

A great deal of evidence in regard to navigation was called, while the Company also called eminent civil engineers to testify that the raising of the height of the side arches could be carried out without difficulty. The point made by the London County Council, however, was that this would involve steepening the approaches to the bridge unduly, and would add considerably to the cost, while it would also interfere with an agreement entered into with the object of preserving the amenities of Lambeth Palace. It was stated by Mr. G. W. Humphreys (Chief Engineer to the London County Council) that the extra cost involved in order to meet the gas companies' suggestion would be £25,000.

After evidence had been called, Mr. W. E. TYLDESLEY JONES, K.C., for the Wandsworth Gas Company, said that the economy effected by bringing coal to Wandsworth direct by these large boats, as against other methods, represented 5s. per ton. Even if they used smaller ships it would cost them another 1s. 6d. per ton above present transport costs, which, on the 250,000 tons consumed by the Company per annum, would represent £18,700 per annum. If this sum were capitalized on a 5 p.ct. table, it represented £375,000. The Company merely asked for the preservation of existing facilities, on the faith of which they had spent a very large sum of money on a fleet of ships, and in making arrangements at Wandsworth for receiving the coal. If the bridge were constructed as suggested by the promoters, there would be many tides when the Company's ships would not get through. They could not say to their consumers "We cannot supply gas this week because the spring tides are on, and we cannot get our ships through."

The case for the South Metropolitan Company differed a little from that of the Wandsworth Company, in that their coal did not pass this part of the river in large steamers, but in barges towed by tugs; and evidence was given to show that the coal traffic would be seriously affected and delayed by the construction of the bridge, and that liability to accidents would be increased.

The position of the Gas Light and Coke Company is much the same as that of the Wandsworth Company, except that their coal steamers are not quite so large. It was pointed out by Mr. HUGH LAW, on behalf of the Gas Light and Coke Company, that they were not opposing in any factious spirit; in fact, they welcomed the proposal to rebuild the bridge, because they were no less interested in street traffic than in river traffic. If the Company felt that the proposals of the London County Council with regard to the height of the side arches represented the extreme limit that could be given without seriously prejudicing the proposals to rebuild the bridge, or without seriously interfering with other interests, they would not oppose. But they considered that increased headway could be given without undue detriment to other interests. Their steamers were of 250 tons cargo capacity, and the Company contended that the proposed bridge would in some respects be worse than any bridge which those steamers had had to negotiate up to the present.

During the hearing of the case, some emphasis was laid by Sir LYNDEN MACASSEY, K.C., upon the fact that the Port of London Authority, who were responsible for navigation on the river, had not opposed, though they had in the House of Lords, and said that the Authority had agreed with the present proposal.

Mr. TYLDESLEY JONES, however, pointed out that no evidence had been called to show that they had agreed with the dimensions; and he held that the reason was that they had never expressed their satisfaction.

It is interesting to note, in this connection, that when Capt. E. C. Shankland (Harbour Master of the Port of London Authority), who had previously given evidence, was recalled to answer questions put by the Committee, he expressed his personal view that the height of the side arches, 16 ft. 8 in., was not sufficient in that part of the river.

As on the occasion of the hearing in the House of Lords, a practical demonstration of navigation on the Thames was provided when the Wandsworth Company's steamer, "Wandle," passed by the Committee rooms, and the proceedings were stopped for a short time, during which the Committee and the interested parties watched her negotiate Westminster Bridge. The members of the Committee also took the opportunity of visiting the site of the proposed bridge, accompanied by the engineers.

When the hearing was concluded, the Committee deliberated in private, and ultimately announced that they found the preamble of the Bill proved.

LEGAL INTELLIGENCE.

A GLASGOW CHEMICAL CONTRACT.

Brotherton & Co., Ltd., v. Glasgow Corporation.

Lord BLACKBURN, in the Court of Session, Edinburgh, disposed of an action at the instance of Messrs. Brotherton & Co., Ltd., ammonia and tar distillers, City Chambers, Leeds, against the Corporation of Glasgow, regarding a contract between the parties and the price to be paid by the pursuers for tar and ammoniacal liquor supplied to them by the defenders under the contract. The contract was originally made in 1904 for five years, but was renewed from time to time. The third contract was for an indefinite period and terminated in July, 1920, when the defenders took over the works at the Provan Gas-Works and have since carried on the production of tar and ammoniacal liquor from the carbonization of the coal used in the manufacture of gas. The dispute arose as to the construction of an article of the contract which dealt with the price to be paid by the pursuers to the defenders for the ammoniacal liquor supplied.

When the case first came before Lord Blackburn, he repelled the whole of the pursuers' pleas in law, and assoilzied the defenders in a judgment which he delivered more than a year ago, holding that the construction put upon the article by the pursuers was erroneous. The pursuers reclaimed, and the First Division recalled Lord Blackburn's interlocutor, and allowed the parties a proof which has since been taken by him. Lord Blackburn, in his judgment on the whole case, in reviewing the evidence led, commented on the correspondence which took place between the parties. In Feb., 1919, pursuers said they would be very glad to make all necessary adjustments when the decision of the Committee had been announced, and added that they would be glad to learn that a reduction in the price to be paid had been sanctioned. This request was refused in April 1919, and the pursuers expressed their surprise. In July, 1919, the defenders gave notice to terminate the contract as at July 31, 1920, and on July 22 pursuers again asked that their equitable application should be considered on the ground that the defenders had readjusted their prices with some of their other contractors. In September they asked for a rebate which would ensure their getting the raw liquor at "approximately the 1914 price." This request was typical of the pursuers' failure to take into consideration that the cost to the defenders of producing the raw liquor must have been increased by many of the same influences as those of which they themselves complained. From Oct. 31, 1919, down to the end of June, the pursuers paid their monthly accounts under deduction of part of the sum due, pending final agreement. During this period they paid to the defenders about £75,000 in all, and did not appear to have withheld more than £4000 altogether. The defenders threatened legal proceedings failing payment of the £4000, and ultimately the sums reserved were paid up. In the letter of May 13, 1920, the pursuers for the first time asserted that the arbiter had misconstrued the terms of the sliding-scale, and suggested a construction which appeared to his Lordship inconsistent with their claim in this action. The remainder of the correspondence was complicated with the negotiations for the transfer of the undertaking at Provan to the defenders, and did not appear to have much bearing on the present case. His Lordship thought it quite clear from the correspondence that the pursuers deliberately refrained from any attempt to challenge the interpretation of the contract so long as they thought there was any possibility of their being allowed to remain in possession of the Provan Works, and that the interpretation now proposed to be put upon the sliding-scale was an entire afterthought. Looking to the fact that the pursuers voluntarily continued year after year to renew the contract, he did not think it would have assisted their present action if they had endeavoured to show and had succeeded in showing that the contract

had proved unremunerative; and he thought the evidence led to the presumption that the part of the contract which dealt with the supply of ammoniacal liquor had been remunerative also. In any event he was satisfied on the evidence that the proper construction had all along been placed by the arbiter upon the sliding-scale; and in these circumstances he could only repeat his former interlocutor, and assoilzie the defenders.

A Patent Action.

On Monday, Mr Justice Russell delivered judgment in an action brought by the *Horstmann Gear Company, Ltd.*, against *Metropolitan Gas-Meters, Ltd*, in which plaintiffs sought an injunction restraining the defendants from infringing Letters Patent No. 23,161 of 1909, for improvements in gas-meters, electric time switches, and timing devices. Plaintiffs alleged that the defendants had infringed by manufacturing, and offering for sale, clockwork gas controllers fitted with the combination of parts described in their complete specification. As an instance of the type of infringement complained of, plaintiffs relied on the manufacture by the defendants, and the sale to Mr. D. E. Garlick, Manager of the Glastonbury Corporation Gas Department, of a clockwork gas controller. Defendants denied the alleged infringement, and said the patent was invalid by reason of prior publication. They further pleaded that it was common knowledge to drive a dial or hand direct from the going barrel or attachment thereto; next, to wind the spring by means of a central arbour round which the hands of the dial revolved, and frictionally to secure adjustable bands and an adjustable dial to the going barrel or attachment thereto by means of a split hollow sleeve. They also maintained that the claiming clauses of the complete specification did not sufficiently define the ambit of the monopoly sought to be protected. Mr. Whitehead, K.C., Mr. Courtenay Terrell, and Mr. Corsellis appeared for the plaintiffs; Mr. Hunter Gray, K.C., and Mr. R. Moritz for the defendants. His Lordship said of the various defences, the only one that had survived was want of subject matter, and he had come to the conclusion that the defendants had failed to establish this defence. He was of opinion that defendants had infringed the invention. Judgment for plaintiffs, with costs.

New Inverted Incandescent Gas Lamp Company, Ltd.

On Tuesday, the 22nd inst., a petition presented by the Company to obtain the sanction of the Court for the confirmation of resolutions reducing the capital by writing-off capital which had been lost, came before Mr. Justice Romer. Mr. Jenkins, K.C., said the Company was formed in 1902 to carry on a business in connection with certain lighting inventions, the nominal capital being £125,000 in £1 shares. The Company incurred heavy losses in connection with its business, and in April special resolutions were passed for the reduction of the capital to £70,374 10s. by cancelling capital to the extent of £44,635 10s. It was proposed to divide the £1 shares into two shares of 10s. each and to increase the capital by the creation of 108,251 new shares of 10s. each. The loss was in respect of patents and leasehold property in Birmingham, and the amount standing to the credit of goodwill was also to be written-off. In future the Company would be known by the name of the Nico Light Company; the Board of Trade having sanctioned the alteration. His Lordship confirmed the resolutions.

MISCELLANEOUS NEWS.

METROPOLITAN GAS COMPANIES' OFFICIAL TESTINGS.

The Gas Referees' reports of the official testings for the past quarter under the provisions of the Gas Regulation Act give the following average calorific values for the gas supplied by the Metropolitan Companies named.

Brentford Gas Company.—503·4 B.Th.U. (declared calorific value, 500 B.Th.U.).

Commercial Gas Company.—483·4 B.Th.U. (declared calorific value, 475 B.Th.U.).

Gas Light and Coke Company.—503·3 B.Th.U. (declared calorific value, 500 B.Th.U.).

South Metropolitan Gas Company.—563·6 B.Th.U. (declared calorific value, 560 B.Th.U.).

South Suburban Gas Company.—490·6 B.Th.U. (declared calorific value, 480 B.Th.U.).

Tottenham District Light, Heat, and Power Company.—502·4 B.Th.U. (declared calorific value, 500 B.Th.U.).

Wandsworth, Wimbledon, and Epsom District Gas Company.—477·1 B.Th.U. (declared calorific value, 470 B.Th.U.).

GAS REGULATION ACT APPLICATIONS.

There has appeared in the "London Gazette" the following further notice regarding an application to the Board of Trade under the Gas Regulation Act.

DECLARATION OF CALORIFIC VALUE.

Poulton-le-Fylde Urban District Council.—480 B.Th.U. (Oct. 1.)

GAS REGULATION ACT ORDERS.

We have received from the Director of Gas Administration a copy of the following further Order made by the Board of Trade under the Gas Regulation Act.

Denny and Dunipace Corporation.

The Order is in the usual terms, but with no figure of price inserted. (July 10.)

WALSALL GAS PROFITS.

A very encouraging report of the year's work of the Walsall gas undertaking was presented to the Town Council recently, when the Manager (Mr. Fred Davies) stated that the number of consumers had increased from 19,672 in 1922-23 to 20,393 in 1923-24.

In comparing the balance of £17,192 with the corresponding figure last year of £18,918, the Manager points out that expenditure on public lamps, rents, rates, and taxes, and fittings increased by £7356, to which must be added £9245 lost by reductions in the price of gas, making a total decrease in the balance available on net revenue account of £16,601, as compared with the previous year. Had the trading conditions been the same as those prevailing in the previous year, the net profit would have been £33,793. Deducting from this figure last year's net profit of £18,918, gives £14,875, which represents the benefit over the year's working owing to increased receipts from residuals and improved methods of working. Deducting from this figure of £14,875 the total increase in receipts from residuals, which were £7778, there is left a balance of £7097 which has been entirely brought about by altered methods of working. With regard to these new methods, Mr. Davies expresses his appreciation of the way in which the staff supported him in the schemes he introduced. He refers to the up-to-date plant provided during the year, and mentions that it effected a total saving of £1128, while the innovation of a gas-meter repairing shop reduced the cost of repairs per meter from 43s. 9d. in 1922-23 to 28s. 6d.

The Gas Committee also make a point of the reductions in price previously authorized, and promise to report to the next meeting of the Council on the question of a further cut. For the relief of the ratepayers, they have transferred £11,734, and a further sum of £5000 is being placed to the reserve and renewals fund account. The number of cubic feet of gas purified increased from 596,242,000 to 632,779,000, and the cost per 1000 c.ft. decreased from 0·61d. to 0·14d. The amount of coal carbonized was 40,927 tons compared with 35,383 tons; and the receipts from residuals were £50,891, as against £43,113. The average net decrease in gas charges during the year was 6·8d. per 1000 c.ft., and the total increase in gas sold was 34,798,000 c.ft., or 6·2 p.ct.

PLUMBERS AND GASFITTING WORK.

Strike at Derby.

Much inconvenience is being caused at Derby through a strike which is evidently due to a dispute between two trade unions. As a result of this strike, which has been going on for nine weeks, about forty Corporation houses cannot be tenanted, because the plumbing essential to the finishing of the dwellings has not been done.

The strike began owing to the refusal of members of the Plumbers' Operatives' Union to do any plumbing in Corporation houses if they could not carry out all the gasfitting work from the outlet of the meter. Many years ago the Derby Gas Company applied to Parliament for powers to carry out the class of work in dispute—the fitting of geysers, cookers, and coppers—and since then they have been doing this to the complete satisfaction of consumers; the staff they employ being members of the National Union of General Workers. Though the men engaged in this work are paid the proper rate of remuneration, the Plumbers' Union contend that only their own members should be employed on it. If this were agreed to, the members of the Union of General Workers would have to be discharged, for, having been members of the latter union for many years, the gasfitters naturally do not wish to transfer to another union. Neither do they wish to lose their present jobs, as would happen if the demands of the Plumbers' Union were conceded.

Weeks ago the Corporation and the Gas Company each offered to make concessions—the Gas Company waiving the rights granted them by Parliament, in view of the urgent necessity for houses—but the Plumbers' Union were adamant, and promptly rejected the offers. Had they been willing to accept them, and slightly modify their demands themselves, the dispute would have been settled; but in the meantime the executive of the National Union of General Workers have heard of the trouble, and have intimated that if the demands of the Plumbers' Union are conceded, and their members are thrown out of employment, they will "at once take steps to protect their interests." As a consequence the offer of concessions was withdrawn. All other efforts to arrive at a settlement have so far failed, though numerous conferences have been held, at all of which Mr. Harry Clark (the Superintendent) has represented the Derby Gas Company.

It is pointed out by the "Derby Daily Express" that the Plumbers' Union and the National Union of General Workers have been at variance on the question of gasfitting for a considerable time. Both are members of the National Federation of Building Trade Operatives; and speaking of the differences between these two unions, Mr. Hayday, M.P., has said that on the affiliation of his organization (the general workers) to the Federation, the General Workers' Union were asked to give up the right to represent some 14,000 men—the demand of the Plumbers' Union being that all outside the manufacturing departments of gas companies should be catered for by the Plumbers' Union. This would have meant that the men would have been taken over from the General Workers' Union by the Plumbers' Union, who, said Mr. Hayday, at one time refused to have them.

There has recently concluded a similar dispute at Nottingham, where, after a strike lasting ten weeks, the Plumbers' Union gave way without having gained the point for which they left work.

At the annual summer carnival in aid of the Ramsbottom Cottage Hospital, the Ramsbottom Gas Company's motor display received an award.

SALFORD GAS REPORT.

In presenting the annual report for the year ended March 31, Mr. F. S. Phillips, the Chairman of the Gas Committee, stated that, notwithstanding bad trade and the competition of electricity, the sales of gas showed an increase of 6·16 p.ct.

The coal carbonized during the past year amounted to 131,165 tons, as compared with 125,030 tons for the previous year—an increase of 6135 tons. The quantity of gas made was 1,813,087,000 c.ft., as compared with 1,725,713,000 c.ft. for the previous year. This is a record not previously equalled in the history of the undertaking.

The total number of gas cookers, ordinary and prepayment, on hire at March 31 was 21,235, and the total number of gas fires on hire at the same date was 5123. These figures show a considerable increase as compared with last year, and indicate the well-established and still increasing popularity of gas for cooking and heating. The demand for these appliances has been so great that the resources of the Department and the manufacturers have been fully taxed during the year. The receipts from the sales of coke and tar show a considerable increase compared with last year; but the receipts from the sales of sulphate of ammonia are below those for last year.

The total expenditure of the Department is higher, owing to the increased prices paid for coal, higher charges for income-tax, and to the fact that the Committee have reverted to the practice of supplying gas cookers and fires on the simple-hire system, necessitating an increased total cost for fixing, &c. Notwithstanding this increased expenditure, they have been able to meet all their statutory obligations and to place £1413 to the credit of the reserve fund.

On April 3, the Committee decided to recommend the Council to reduce the price of gas from the June quarter by 4d. per 1000 c.ft. to consumers by ordinary meter, and to increase the quantity supplied by prepayment meter from 21·33 c.ft. to 22·96 c.ft. per penny. These recommendations were approved by the Council on May 7.

SOUTHPORT ANNUAL REPORT.

The report on the working on the Southport Corporation Gas Estate for the year ended March 31 (submitted by Mr. John Bond, the Gas Engineer) states that the increase in the consumption of gas amounts to 36,497,700 c.ft., which is equivalent to 5·83 p.ct. when compared with last year's figures. The prepayment system of gas supply amounts to 17·49 p.ct. of the gas supplied. This shows a decrease of 0·55 p.ct. on last year's figures. The average price received for all gas amounts to 3s. 4·04d. per 1000 c.ft.; last year's average price being 3s. 10·09d. At the commencement of the year the price of gas to ordinary consumers was 3s. 6d. per 1000 c.ft. During the last quarter of the year the price was reduced to 3s. 3d. per 1000 c.ft., less 5 p.ct.; and it was resolved that a further reduction of 3d. per 1000 c.ft. should be made after March 31.

The net capital indebtedness at March 31 was £110,986, which is equivalent to 3s. 4·20d. per 1000 c.ft. of gas sold, as against 3s. 9·42d. per 1000 c.ft. for last year. The gross profit amounts to £28,537; and after paying interest and sinking fund charges (£12,674), and liquidating the debt on the vertical retorts and telpher plant amounting to £10,761, there remains a balance in hand of £5645 to be carried forward to next year's accounts.

Summary of Gas Made and Sold.

	C.Ft.	C.Ft.
Gas made		704,611,000
Gas sold—private consumers	605,115,800	
Gas sold—public lamps	57,298,900	
Gas supplied free	114,200	
Gas used at works, offices, &c., and temperature corrections	14,727,400	
		677,256,300

COMBINED GAS AND ELECTRICITY SUPPLY.

A Sligo Scheme.

Of late years increasing attention has been given to the combination with existing gas undertakings of a supply of electricity—which is a particularly inviting proposition in the smaller towns, where there is not likely to be sufficient business to enable two undertakings, with separate staffs and works, to flourish.

Now more than twelve months ago, the Chairman of the Sligo Gas Company (Mr. Edward J. Tighe), who is a well-known business man in the town, with his co-Directors, conceived the idea of meeting a persistent demand which had arisen for a supply of electricity by the formulating of a scheme under the auspices of the Gas Company. The services were called in of Mr. J. C. Elvy, A.M.I.E.E., M.I.E.S., Consulting Engineer, of No. 12, Tavistock Street, London, W.C., and he has drawn up a plan for furnishing electric current in conjunction with the working of the gas undertaking. The whole of the installation will be placed on the gas-works site, thus avoiding the purchase of any extra land, and the current will be generated by means of coke gas producers, with the distinct advantage of having the town gas as a stand-by, should anything untoward occur in connection with the gas producing section. With the high prices obtaining for oil in the Irish Free State, combined with the instability of such prices, it is felt that the scheme proposed will be far and away the best to adopt, especially in view of the fact that the gas-works themselves will be able to supply sufficient fuel for the producers.

An Act to carry the project into effect has now passed the Irish Free State Senate, and advertisements are out for tenders for the work. The broad-minded action of the Board of the Sligo Gas Company in this matter is to be commended, and will doubtless in due course be followed by other gas companies in the Irish Free State who may be similarly situated. The name of the Company is to be changed to the Sligo Lighting and Electric Power Company.

WELSBACH LIGHT COMPANY, LTD.

Difficult Conditions in the Mantle Industry.

The Thirteenth Annual General Meeting of the Company was held on Thursday last, at Winchester House, Old Broad Street, E.C.—Mr. J. R. YATES (the Chairman) presiding.

The SECRETARY (Mr. E. J. Butcher) read the notice convening the meeting; and the report of the Directors [*ante*, p. 341] and the statement of accounts for the financial year ended March 31 last, were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, said that on the assets side of the balance-sheet there was an increase of over £7000 on freehold properties, &c., arising from the purchase of a Leeds freehold, in consequence of the Government being unable to renew the lease of the former depot. The investment was justifying itself by increased trade. Stock (which included raw materials and manufactured or partly manufactured goods), at practically £100,000, was up by about £17,000, which represented a larger volume and greater variety of goods. In the item of Associated Companies the Board had deemed it prudent to write £2000 off the value of one of the shareholdings, and this notwithstanding the appreciation in value of the investment in another associated Company. The total investments, including gilt-edged securities, had decreased to the extent of about £30,000—an amount by which the other assets were increased, without taking account of a reduction as compared with last year of £4380 in the debenture debt and £1500 sundry creditors. On the profit and loss account, the profit on trading was down from some £8000 to £2000, after deducting the loss incurred by an associated Company. But for this loss, and some non-recurring expenditure, the trading profit of the year would have exceeded that of the previous year. Profit on realization of investments amounted to £1374. This brought the profits under this head in three years to nearly £20,000, thus indicating the vigilance and care exercised. Though they would all have liked to see a larger trading profit, there could be no question as to the Company's strong financial position. It was somewhat better than at March 31, 1923, or at March 31, 1922, and during those two years they had paid in dividends over £32,000, and had reduced the debenture liability by £14,000. Further, it would interest them to know that, notwithstanding the difficulties of the past year, the Company and its associated Companies had an increased turnover, expressed in units of manufacture and also in pounds sterling, over the figures of the two preceding years. The shareholders would appreciate, therefore, that the decline in profits had been due, not to an actual falling off in sales, but in the main to a reduction in selling prices owing to competition with which they had been faced.

BROADENING OF INTERESTS.

The long view taken by the Board led them to adopt the policy to which he had previously referred of broadening and extending the Company's interests and activities, so that, should fortune no longer favour the gas mantle industry, they would not be dependent on this particular form of business. In this the Directors had so well succeeded that, during the last six years, the proportion of the turnover on what might be called "Sundries"—that was, goods other than mantles—had gradually risen by upwards of 30 p.ct. expressed in pounds sterling. This increase was still continuing in the current year. The percentage of profit on those sundries up to the present had not been large, but the principle had been followed that, where the ratio of profit was small, every effort should be made to increase the total business, and thus increase the amount of profit as distinguished from the ratio of profit. It would be realized that, in entering a new market, there were at the outset some expenses which were not recurring ones. As showing that the trade which they called "Sundries" was not an insignificant one, he would say that it comprised, among many others, gas burners and pendants, lighting glassware, pressed glassware, mirrors, refrigerators, gas and oil radiators and stoves, electrical cooking and heating goods, paint, geysers, and various domestic utensils. Various improvements had been made (as the result of exhaustive tests in the Company's workshops) in gas burners, and the upright Kern maintained its superiority over all other burners in the same category to the extent of some 20 to 25 p.ct.—a fact which was recognized by a large number of gas companies. An inverted Kern burner using the superheater principle was a new feature which they were bringing forward for the current season. Continued progress was to be recorded in the Company's heating and cooking appliances. The sales of "Kern" radiators were fully maintained last year, and the small "Handi-Heater" was proving a great success—so much so that last year, owing to manufacturing difficulties, they could not meet all the demands for it. This year, in anticipation of still further demands, special manufacturing arrangements had been made. Further extensions were also being made into the realm of gas-using appliances suitable for cooking, in which gas at present far outstripped electricity in general usefulness and applicability. But in cases where, owing to the construction of houses or other circumstances, customers prefer electrical goods, the Company could at once give them satisfaction. Their advances in the field of electricity had been well received, and as they were supplying goods of what he might call "the Welsbach quality," sales were being gradually extended.

THE GAS-MANTLE OUTLOOK.

So much for the past year. As to the current year, the prospects were not so clear as could be desired, though the turnover in sundries was still going up. The outlook as regarded mantles was obscured by the decision of the Government to allow the depreciated currency provisions of the Safeguarding of Industries Act to expire in August. When

in 1921 this measure became law, he referred to it at the annual meeting as being something less than had been hoped for, but a tentative step in the right direction. He ventured to think that the Labour Government would have been better advised, not merely to continue, but to simplify and strengthen these provisions. Not the less might they have expected this when they remembered how strongly Protectionist trade unions were as regarded what they considered the direct interest of labour itself. He would add an observation on the relations between politics and trade—relations which appeared to be inevitable, especially as regarded foreign trade. In this country there had been developed the commendable habit of declining to allow, in the main, the general foreign policy to be the shuttlecock of political parties; one party having attained to power, continued the general foreign policy of its predecessors. It might be well if something at least analogous could be adopted in determining the attitude of Governments towards trade. Let commerce be lifted out of the rut of polemical disputation. Let Governments determine their trade policy, not on the basis of political shibboleths, still less on the basis of vote-catching capacity, but on that of the collective wisdom of an independent body comprising those best fitted by training and experience to advise thereon. At any rate, let them aim at comparative continuity. Though the Board were not entirely without hope that sooner or later some British Government might recognize its obligations towards British traders and workers, it was clear to all that the time had not yet arrived. The obligation might perhaps be measured more readily when he told them that the Company's payments in wages, salaries, and taxation ran into six figures. This showed the assistance which the Company (in common with others) rendered in solving the problems of employment and taxation, and gave rise to some claim for consideration. If, however, they could not obtain what they felt they were entitled to expect from the Government, the Directors were not content to sit still or to get unduly "rattled." They must more than ever look to their own unaided efforts.

THE ORGANIZATION NEVER MORE EFFICIENT THAN NOW.

He had already told them that the turnover last year showed an increase in units, and even in pounds sterling, notwithstanding that prices had suffered an all-round reduction. This demonstrated that the goodwill of the business had been kept up. Indeed, the Board had specially seen to it that this should not be allowed to decline. Publicity, propaganda, poster campaigns, exhibits in various parts of the country and at the National Gas Exhibition, had all had as their object the retention—and, indeed, advancement—of the Company's position, not merely in the gas-mantle trade, but also in sundries. True, this had meant expense, for none of these things could be done without expenditure of money; but he believed that they would continue to reap the benefit of this expenditure. Publicity and propaganda, were, however, not enough; they must be backed by a highly efficient organization, by service to customers, and quality of manufacture. In all these directions the Company stood well. In the history of the undertaking, which he had known intimately from its inception, the organization was never more efficient and wideawake than to-day. The customers appreciated the Company's service to them, and the quality of Welsbach products had never stood higher. They would need no better evidence of this than the statement that the number of customers' accounts on the sales ledger was steadily rising—the increase since March 31, 1922, being fully 20 p.ct. The Company were not alone in complaining that prices were not remunerative. Similar complaints were to be heard upon all hands, and he refused to think that, with a little patience, they could not successfully pass through this trying period, fortified as they were by the conservative policy adopted when they were making large profits. The Directors (who, with their associates and friends, had a large interest in the Company) would continue to give to the business their unremitting attention, and in this they would be backed up by the General Manager (Mr. Harold Talbot), the Works Manager (Mr. Bark), and by all the other heads of departments and members of the staff, to whom thanks were due for their labours during the past year.

Mr. H. W. WALMSLEY seconded the resolution.

This was followed by a discussion, in which various points were raised by shareholders; and these having been replied to by the Chairman, the motion was carried unanimously. One of the views expressed from the body of the hall was that, having regard to the enormously increased cost of living in Germany, there is very little to fear for the time being from German competition in the mantle industry.

Subsequently the Chairman was re-elected to his seat at the Board, and the Auditors (Messrs. Deloitte, Plender, Griffiths, and Co.) were reappointed.

The proceedings were brought to a close with a cordial vote of thanks to the Chairman, Directors, and staff for their good services to the Company during a difficult year.

Montrose Gas Company, Ltd.—The Company's profit for the year ended June 30 amounted to £3229. A dividend of 10 p.ct., less tax, is recommended. Nearly 3 million c.ft. more gas was made than in the previous year.

Inverurie Gas Company.—The accounts submitted at the annual meeting of the Company showed a profit for the year, after allowing for depreciation, of £428, and the balance brought forward from the previous year was £759. A sum of £500 was transferred to the reserve fund, and a dividend of 7½ p.ct., free of tax, declared.

Clitheroe Gas-Works Results.—In the Clitheroe Town Council, last week, the Mayor gave a statement showing the result of the working of the gas undertaking for the year ended March 31. The gross profit amounted to £3488, against £7064 for the previous year; the net profit being £1320, compared with £4847. The decrease in the net profit was accounted for by a reduction in the price of gas amounting to £2480, increased rates and taxes of £875, and increased cost of coal £716. Residuals realized £8745, compared with £8120. The sale of gas showed the satisfactory increase of 4 million c.ft. The prospects for this year were not so promising. They estimated they would have to spend something like £1000 more in coal, while the value of residuals had fallen.

ELLESMERE PORT AND WHITBY GAS ORDER.

An application by the Ellesmere Port and Whitby Urban District Council for a Special Order under section 10 of the Gas Regulation Act, the chief purpose of which was to enable the promoters to acquire the undertaking of the Sutton and Hooton Gas Company, Ltd., was the subject of inquiry by Mr. H. C. HONEY (Director of Gas Administration at the Board of Trade) on Friday, July 4.

There was opposition by the Wirral Rural District Council (whose district comprises the greater part of the area of supply of the Company), who considered that they should be given the opportunity of acquiring the Company's undertaking rather than that it should be acquired by the Ellesmere Port and Whitby Urban District Council, on the principle that it was better for an area to be supplied by its own local authority than by a neighbouring authority. There were also applications by Mr. Charles Cliff (Manager of the Company's works), and by the Company's employees, for compensation in the event of their services being dispensed with.

The Ellesmere Port and Whitby Urban District Council were represented by Mr. H. F. Bidder; the Wirral Rural District Council by Mr. R. Fitzgerald; Mr. Cliff was represented by Mr. M. E. C. Baggallay; and the remaining employees by Mr. E. Wooll.

Mr. BIDDER, in opening the case for the Ellesmere Port and Whitby Urban District Council, gave figures relating to the increase in population and rateable value since 1901, when the Urban District Council was formed, in order to show that considerable development had been taking place in the area. He gave details of the loans incurred by the Council. The loans under the Sanitary Acts amounted to £33,709, out of a possible £136,656, and the rest of the loans totalled approximately £168,000. The outstanding loan on the gas undertaking is £63,755. Up to 1914 gas was supplied from works of the London and North Western Railway Company. In 1914 the Council promoted a Bill to purchase the undertaking, and the capital account of that undertaking at present is £82,000. The maximum prices under their original Act were, for ordinary consumers 4s. 6d. per 1000 c.ft., and for slot-meter consumers 5s. The charges were increased by an Order of 1919, but that expired in 1923, and they are now working under their original Act. The actual charges at present are 4s. to ordinary consumers, less 2½ p.ct. discount; 3s. 9d. to special industrial consumers, less 2½ p.ct.; and the charge to slot consumers works out at 4s. 11½d., including the hire of fittings. The form in which the charge is made is 14 c.ft. per penny, with a discount of 2d. in the shilling. The works capacity at present is 100 million c.ft. per annum, or, by steaming, which would not unduly reduce the calorific value, 120 million c.ft. per annum. The quantity of gas made for the year ended March 31 last was 66 millions, and it was the idea of the Council that, by extending the body of consumers, they would be able to reduce charges both to the present consumers and the new consumers they hoped to obtain. With that idea they had entered into negotiations with the Sutton and Hooton Gas Company, with a view to supplying them with gas in bulk. The Company, however, did not fall in with the idea, but had expressed the opinion that it would be better, from the economic and every other point of view, if the two undertakings were under one control. They were willing to sell. Accordingly, negotiations were entered into with a view to arriving at a price, and these negotiations were brought to a successful conclusion. The purchase price was set out in an agreement scheduled to the Order. It amounted to £20,931 in respect of shares; debenture liabilities of £5450 as well as other outstanding liabilities; *plus* £1000 in respect of claims for compensation made against the Company; so that, allowing something for expenses, the total would be (say) £29,000. The price to be paid was amply justified by the Council's inquiries into the conditions and prospects of the Company's undertaking. The average profits were in the neighbourhood of £2500 a year, or, if the most ample allowance were made for depreciation, £2000 a year, and 12½ to 15 years' purchase of this would come to £25,000 or £30,000.

Dealing with the opposition of the Wirral Rural District Council, Mr. Bidder said it was their view that the Ellesmere Port Urban District Council should not take over the Company's undertaking, because it was in the area of the Rural District Council, and that if anybody took it over at all it should be the Rural District Council. His answer to this was that the Board of Trade had no power to make an Order enabling them to do so, and a rural council had no power to take over a gas undertaking; therefore, the Rural District Council's objection in that respect was misconceived. Then they had objected that the price to be charged was too high. He did not know what that had to do with the Wirral Urban District Council, but he believed that, on the merits of the case, he would satisfy the Board of Trade that it was not. The only thing that mattered to them was whether or not the transaction would result in economy, and he could satisfy the Board that it would. There was a clause in the Order providing that, prior to the date on which the calorific value was declared, the Urban District Council should be empowered to charge 1s. per 1000 c.ft. more in the added area than in their existing area, and, after the declared date, the differential should be 2d. per therm. Even with that differential, said Counsel, the rates charged in the added area would fall as soon as the Company's undertaking was acquired by the Urban District Council. Extensive mains had to be laid for the supply of the added area, which justified a certain contribution by the people at the end of them, but the economies which would be effected by combining the two undertakings would more than counterbalance that.

Referring to the claims for compensation by Mr. Cliff and other employees of the Company, Counsel said that if it had been arranged to supply the Company with gas in bulk, that would have been done without necessitating their applying for an Order, and there could not have been the slightest ground for any claim analogous to the claim now set up by the employees. Anything that happened between the Company and their employees would have been a question of grace between them. He could not see how, if that were the case, the mere fact that the Urban District Council had applied to the Board of Trade for an Order gave the employees a greater claim than they

would have had if arrangements had been come to for a supply in bulk. Apart from this, however, the agreement scheduled to the Order provided that, in addition to the purchase money, the Council should pay £1000 as compensation for loss of office to the Directors, the gas engineer, gas manager, secretary, auditors, and all other employees (including any pensioners who might previously have been in the employ of the Company), the sum to be divided as determined by the Company, and the Company should indemnify the Council from all claims for compensation for loss of office of all or any such persons or employees. If he were right that no enforceable claim arose, and if an agreement had been come to between the Council and the Company settling what contribution the Council should make to the Company in this respect, he suggested there were no grounds whatever for inserting anything in the Order in this connection. It was not only unusual but inadvisable to insert provisions, against the wishes of the promoters, putting upon them a larger liability in respect of the servants of the Company who might be discharged in consequence of economies resulting from the granting of the Order. As to Mr. Cliff, it was agreed that he should be taken over by the Council, and, subject to satisfactory service, should be employed by them for two years on the same terms and conditions as those which governed his employment previously, as far as applicable, and at the same salary—namely, £260 per annum—with the tenancy of the house at the Company's works, free of rent, rates, and taxes. Mr. Bidder said there was no certainty that Mr. Cliff would not be still employed after the two years had expired, whereas at present he was liable to three months' notice, so that he was better off. At the end of two years, if he were in difficulty, there would be something for him out of the £1000 mentioned.

Dealing with maximum prices after the declaration of the calorific value, Counsel said they were originally fixed in the Order at 1s. 7d. per therm within the existing limits and 1s. 9d. in the added limits, but the Council had reduced the figures to 1s. 4d. and 1s. 6d. respectively, as these latter were considered sufficient.

Mr. *Arthur Collins* (Financial Adviser to Municipal Authorities), who has been advising the Ellesmere Port and Whitby Urban District Council with regard to the purchase of the Company's undertaking, then gave evidence, and expressed the opinion that the purchase price was reasonable and justifiable.

At this point it was indicated that the Wirral Rural District Council did not challenge the purchase price. They wanted to know, however, how the £1000 compensation was to be allocated. They also wanted information with regard to the existing liabilities of the Company which were to be taken over by the Urban District Council, in addition to the price to be paid.

Witness said that the Directors of the Company had offered the undertaking at £33,000. He had suggested to the Urban District Council that, if they could get the undertaking for a figure not exceeding £30,000, and as near £28,000 as possible, it would be reasonable. The settlement ultimately was for £28,976 in cash, arrived at roughly on the £29,000 basis, this £29,000 being 14½ years' purchase of £2000, which was his conservative estimate of the net maintainable revenue. There was then a revision owing to the Company's having issued debentures beyond their statutory limits. They had given the Council the benefit of redeeming the extra debentures, and had given them the discount secured by redeeming them at 81½ instead of at par. That reduced the purchase price from £28,976 to £28,134.

Mr. HONEY said he was satisfied as to the purchase price.

Dealing with the suggestion that part of the undertaking should be purchased by the Wirral Rural District Council, witness said it would not be of the same value to them as to the Ellesmere Port Urban District Council, and, from the financial point of view, it was difficult to see what advantage the Wirral Rural District Council could hope to obtain by supplying their own district.

Mr. *William Newbigging* (Consulting Engineer, who designed the present works of the Urban District Council) described the acquisition of the Company's undertaking as an excellent proposal, and one which would be in the interests of the consumers in both areas. The works of the Urban District Council were up-to-date, and there was a considerable surplus capacity. They were designed for economical extension, but not primarily with a view to taking over the added area now proposed. The undertaking had to be worked spasmodically at present, and as a result they were only selling 7 cwt. of coke per ton of coal carbonized, whereas they should sell 9 or 10 cwt.

Mr. FITZGERALD put a number of questions to show that the greater amount of gas which would be made at the Ellesmere Port works would reduce capital charges, and consequently the price of gas within the Urban District Council's area, as well as aiding the ratepayers. Mr. Newbigging said it would benefit the consumers both inside and outside the area. He agreed that the consumers in the Company's area would get cheaper gas than at present if the Company took a bulk supply from the Urban District Council, but it would be cheaper still if the Company were absorbed by the latter, because there would be a greater reduction of officials and employees than if the bulk supply proposal was adopted.

Mr. *R. P. Sing* (Chairman of the Sutton and Hooton Gas Company, and a Director of the Chester United Gas Company) considered that the proposal would benefit consumers in both areas, and the differential to the consumers in the Company's area would be absolutely fair in the initial stages. It would probably disappear later.

Asked by Mr. Fitzgerald why the undertaking was not offered to the Wirral Rural District Council instead of to the Ellesmere Port Urban District Council, witness said he saw the wisdom of supplying gas over larger areas and amalgamating small concerns.

This closed the promoters' case.

Mr. FITZGERALD, on behalf of the Wirral Rural District Council, said the ground of their objection was the principle that, if a public utility service was to be carried on by a local authority, then, *prima facie*, the one and only authority to carry it on was the one serving the district supplied—provided, of course, that they were able and willing to take over the undertaking.

Mr. HONEY, in the course of further discussion as to the principle involved, said he did not like discussing these things on the basis of the rights of a local authority. He much preferred to deal with the interests of the consumers. If it could be shown that it was in the interests of the consumers in the Wirral Rural District that the sale of the undertaking to the Ellesmere Port Urban District Council should not be sanctioned, that was one matter. But to say that because they were the Rural District Council they ought to have the undertaking, irrespective of the interests of the consumers in the area, was another matter, and it did not impress him at all. He wanted to know if, by taking over the undertaking, the Wirral Rural District Council could better serve the consumers than the Ellesmere Port Urban District Council could.

COUNSEL contended that the only advantage, from the point of view of the consumers, was that there would be a saving in administration. This was a very small amount. On the other hand, there would be great disadvantages if the undertaking were in the hands of the Ellesmere Port Urban District Council. As to the differential price, he said that, in fact, Wirral consumers were now being charged a lower price than the Ellesmere Port consumers, so that any differential should be in favour of the Wirral consumers rather than against them. The price charged by the Ellesmere Port Urban District Council did not cover their costs; on the other hand, the price charged by the Company exceeded what need be charged even if they paid the maximum dividend; and thirdly, the calorific value of the gas in Ellesmere Port was lower than that in the Company's area, and was even as low as 300 in September, 1923. He would not be content with the Order, however, even if the differential were in his favour. He asked that it should be rejected, and, failing that, he asked for a clause providing that if at any time the Wirral Rural District Council were authorized by the Minister of Health, under the Public Health Act, or by Parliament, to supply gas, they should be entitled to purchase so much of the undertaking as was within their area, at a price proportionate to that paid by the Urban District Council, and, if they proceeded by Bill, the Ellesmere Port Urban District Council should not be allowed to oppose except on questions of detail.

In reply to Mr. Honey, Mr. Bidder said that if the Rural District Council could not get purchase power, he would prefer that the undertaking should remain in the hands of the Company.

Mr. *Arthur Valon* (Consulting Engineer), who has been advising the Wirral Rural District Council, then gave evidence, and dealt in detail with the accounts of the Urban District Council and the Company over a period of years. He said that the Urban District Council had charged less than they should have done, in order to cover costs, by the equivalent of 4d. per 1000 c.ft., and that the Company had charged more than they need have done by the equivalent of 4d. per 1000 c.ft., so that the difference of 1s. 3d. in the prices charged in the two areas should be reduced by 8d. per thousand. If the Urban District Council made 20,000 c.ft. per ton of coal, and the Company made 15,000 c.ft. per ton, it was fair to assume there was a difference of 25 p.ct. in the calorific value, and in addition, the coal used by the Company was better than that used by the Urban District Council. From his analysis of the accounts it was clear that the quality of gas supplied by the Urban District Council in 1923 was between 300 and 350 B.Th.U. They had increased it to something like 400 B.Th.U. since; but whether or not they could supply that gas for 4s. per 1000 c.ft. they would not know until the end of the present financial year. On the figures available, therefore, the gas supplied in Ellesmere Port was dearer than that in the Company's area; the main reason being the heavy capital charges at Ellesmere Port, which amounted to 27·19d. per 1000 c.ft., as compared with 8·57d. per 1000 c.ft. in the Company's area. Gas ought to be manufactured and supplied more cheaply from the one works than from the two separately, but the difficulty was that, unless arrangements were very carefully made, the bulk of the advantage, or perhaps the whole of it, would go to one part of the area only, and, so far as he could see, the arrangement proposed in the Order meant exploitation of the Wirral consumers for the benefit of the consumers or ratepayers, or both, in Ellesmere Port.

Witness considered that 4½d. per 1000 c.ft. was totally inadequate for maintenance, and the works at Ellesmere Port gave the impression that they had been neglected. The leakage had gone up from 5 p.ct. in 1920 to 10·34 p.ct. in 1924, which indicated that the mains were not properly looked after. If the undertaking remained with the Company, the Wirral consumers would get cheaper gas than if it were handed over to the Urban District Council, and they would get it cheaper still if the Company secured a bulk supply from the latter.

Mr. *Samuel Glover* (Past-President of the Institution of Gas Engineers, and Adviser to the Wirral Rural District Council) corroborated the evidence of Mr. Valon, and emphasized the absurdity of a differential price being imposed upon the consumers in Wirral. Whoever became responsible for distributing gas in the Wirral area would have to spend a considerable amount of money on distributing plant within that area.

In the course of cross-examination, witness was asked whether it was not the fact that the Urban District Council could turn out twice the amount of gas they are now supplying; he replied that, even so, they could not purify or store it. Mr. Bidder retorted that the evidence was to the effect that they could.

In reply to Mr. Honey, who asked whether the quantity manufactured by the Sutton and Hooton Company was near to their capacity, witness said they would require to extend their manufacturing plant in two years.

In regard to a statement made by Mr. Glover that consumption in Ellesmere Port was decreasing, Mr. Bidder quoted figures to show that the consumption had increased from 22 millions in 1917 to 66 millions in 1924.

This closed the case for the Wirral Rural District Council.

Mr. WOOLL, putting the case for the employees of the Sutton and Hooton Company, made it clear that they had nothing at all against their employers or the Ellesmere Port Urban District Council, but simply sought protection. Protection was particularly important in this case, because it had been conceded by the promoters that it was not protection merely against any contingent calamity, but against the inevitable consequences of this proposed absorption—namely, unemployment. The questions to be decided were whether the Board of Trade had power to insert a protective clause, and whether, if they

had that power, they should exert it in favour of the workmen. That the Board of Trade had power was perfectly clear from the terms of section 10 of the Gas Regulation Act. His main argument was that, clearly, procedure by Special Order was a substitute for procedure by a Parliamentary Bill, because ultimately the granting of an Order was subject to the same confirming authority as a Bill. That being so, it would be farcical to suggest that the public conscience should assume a modified form in a Special Order made by the Board of Trade as compared with the form it would assume in a Parliamentary Bill. Dealing with the policy of the Legislature on this question, he said the principle he was contending for was one which had been developing since 1888. In section 120 of the Local Government Act of that year, which Act readjusted areas of administration all over the country, statutory right was given to grant compensation to officials and officers of public bodies who lost their offices through the working of that Act, and the compensation was on a definite basis. As to the £1000 which had been agreed to be paid to the Sutton and Hooton Company by the Ellesmere Port Urban District Council for compensation purposes, £600 was to be claimed by officials, and £400 was to be set aside as a benevolent fund, of which £200 was to be earmarked to meet the possible demands of Mr. Cliff at the end of two years. The remaining £200 was to go to a fund to be administered by Mr. Sing and a couple of Directors, always on the basis that nobody was to have any right to it. The employees in this case, however, did not see why they should be on that basis, for, if they were working in an electricity undertaking or a small railway, they would be on a legal basis. He submitted the draft of a clause based on a clause in the Electricity (Supply) Act, 1919. This was to the effect that the employees should be engaged by the Ellesmere Port Urban District Council, and if within three years a worker proved to a referee (whose appointment was a matter for agreement between the parties) that he had suffered loss of employment or diminution of emoluments, otherwise than on the ground of misconduct, &c., or had relinquished employment through being required to do duties not analogous to his previous duties, or had been placed in a worse position than previously, and the Council did not satisfy the referee, there should be paid to the employee such compensation as the referee should decide upon, including such expenses as were incurred in moving to another locality. That, said Mr. Wooll, was virtually a reproduction of section 16 of the Electricity (Supply) Act, except that it substituted three years for five years.

The case for Mr. Cliff was then dealt with.

Mr. *C. Cliff* (Manager of the Company's works) gave evidence to the effect that the provision of a house, coal, gas, and a bonus which he received practically every year, added an equivalent of a little over £100 to his annual salary, bringing the figure to £370 per annum.

Mr. BAGGALAY (for Mr. Cliff) said it was abundantly clear that Mr. Cliff's services would not be required by the Urban District Council after two years, having regard to Mr. Sing's evidence. Therefore, compensation to the extent of £200 would be inadequate. Mr. Cliff was not endeavouring to block the transfer of the undertaking, but was perfectly willing to serve either the Ellesmere Port Urban District Council or the Wirral Rural District Council as well as he had served the Company. He asked for the insertion of a clause giving him the option of taking compensation in the form of a lump sum or in the form of an annuity. If the former, the amount should be ten times his average remuneration during the last five years. (The precedent for this was the Gosport Order.) If Mr. Cliff chose the annuity, the annual amount was to be equal to as many sixtieths of his average annual remuneration as he had had years service with the Company on the date of transfer, *plus* ten-sixtieths of the average annual remuneration.

Mr. HONEY asked Mr. Bidder if the Ellesmere Port Urban District Council considered it essential that there should be a differential. He did not wish to prejudge the case, he said, but simply wanted to know the limits of the position.

Mr. BIDDER replied that the promoters were willing that a provision should be inserted for revision within any period the Board of Trade thought fit.

Mr. HONEY asked if it were considered essential that they should retain power to apply any profits they might make to the aid of rates in Ellesmere Port.

Mr. BIDDER replied that they would agree to the insertion of a clause providing that no profits should be paid to the relief of rates so long as the differential was in force.

The hearing then closed.

TRADE NOTES.

Complete Carbonization.

Messrs. Drakes, Ltd., of Halifax, are makers of the Robinson mixed gas plant, and have recently issued an interesting pamphlet descriptive of the process, in which are detailed the advantages of the system. An important feature is that it can be worked with ordinary retort-house labour, and the existing retort-bench ironwork utilized. The make from such a plant is 180 therms per ton.

Messrs. J. & W. B. Smith, Ltd.

We learn that Mr. Frederick Watkinson has resigned his connection with the above Company. At the same time, the Company ask us to mention that, consequent on the recent fire which occurred at their premises, they are entirely redecorating and renovating their showrooms. New catalogues are also now in course of preparation; and these will be also issued to the trade early in the coming lighting season. Various departments have been reorganized on a sound business basis; and it is hoped, by concentrating on the stock lines, to be able to give prompt and efficient service to all clients.

Quality of Gas at Budleigh Salterton.—Budleigh Salterton Urban District Council have received a letter from the local Tradesmen's Association urging the Council to take steps to improve the quality of the gas and to endeavour to secure a reduction in the price. The Council decided to appoint Mr. G. W. Slatter, of Paignton, gas examiner.

THE NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

The week has brought no improvement in the market generally; but an encouraging feature has been a steadying in the best Northumberland steam section. While there is as yet no great improvement to payable prices, there has been a better tendency to check the continuous fall which has been experienced lately. This has led gas coal producers to hope that the seasonal and contract demand due before long may bring about some revival in their department.

In the meantime, most depressing conditions prevail, and many collieries are having to work short time, while the men at some pits are receiving notice to terminate their agreements entirely, pending a return to better conditions.

While best gas coals continue to be quoted steadily as high as 22s. 6d. for forward business, they are obtainable at considerably less for this month's shipment, and in some cases even for August. For such Continental business as is offering, German coals are competing heavily.

YORKSHIRE AND LANCASHIRE COAL TRADE

From our Local Correspondent.

The trade in household coal in Yorkshire and Lancashire remains quiet, and a period of three or four weeks is likely to elapse before there is any improvement.

Industrial demands are also on the quiet side, and there is little improvement in prospect owing to the approach of holidays. Most concerns prefer to use up stocks they have accumulated. Prices for current delivery are tending to decline.

Gas coals are not in urgent request. Forward deliveries are not giving to the collieries the anticipated prices, although these are in advance of last year's figures.

The shipping outlook is dull, and presumably will continue so for some little time. The prices offered by the nearer Continental countries are of no interest to British exporters while costs remain as at present.

Nominal prices at Hull at the week-end were: Bunkers—Yorks, Derby, and Notts large screened steam, f.o.b. Humber ports, 20s. to 20s. 6d. per ton. Cargo for export, f.o.b. usual shipping ports—Best York hards, Association, 23s.; Derby best hards, 22s. 9d. to 24s. 6d.; West Yorks Hartleys, 20s. 6d. to 24s. 6d.; South Yorks washed doubles and singles, 20s.; dry doubles, 16s. to 16s. 6d.; South Yorks washed smalls, 15s. 6d. to 15s. 9d.; Derby slack, 1 in., 13s. 6d.; South Yorks rough slack, 14s.; gas coke, 33s. to 34s.; foundry furnace coke, 25s. to 25s. 6d.; washed smithy peas, 22s. 6d. to 26s. 6d.; washed steam thirds, 19s. 6d.; South Yorks washed trebles, 21s. per ton.

In Lancashire, selling prices are irregular, but no change has been openly reported in colliery prices. Slack is quoted nominally from 13s. to 17s. per ton at the pits, and unscreened industrial coal at 20s. to 21s. per ton.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

The pits are making good time for this season of the year. In rare cases they are running the full week, but the average is nearer four days. Gas undertakings are getting all the coal they can accommodate. Some of them are rather embarrassed to know what to do with the influx, and the slow movement of wagons is provoking remonstrance. The house coal trade is decidedly more active than is usual in July. Householders who have storage room are in very many instances getting in their winter supplies, and merchants are putting down substantial stocks.

With a sluggish demand for industrial fuel prices have been weakened somewhat by the excess of slacks and small. Concessions are only made in special cases, where prompt relief of over-production is necessary.

The gas coke trade is comparatively quiet; but prices are maintained in spite of protests by trade and domestic consumers. Furnace coke is obtainable at less than the contract rates. Three blast-furnaces in South Staffordshire have been damped down within the past few days.

Tiverton Gas Undertaking.—The Mayor of Tiverton (Mr. W. H. Huxtable) reported at last week's Town Council meeting that the annual accounts of the gas undertaking showed a total revenue of £19,345. Though the receipts were £1050 less than the previous year, because gas was 6d. per 1000 c.ft. cheaper, the revenue was only £176 less. The total expenditure was £17,548, or £761 more than in the previous year, when the net profit was £1219 compared with £483 this year.

Public Lighting of Tavistock.—At a meeting of the Tavistock Urban District Council last Wednesday, discussion took place upon the tenders received for street lighting for the five years to commence on Aug. 14 next. Two tenders had been received—one from the Tavistock Lighting, Coal, and Gas Company at £375, and the other from the Tavistock Electric Light Company at £450. It was reported that, as a result of opposition to electric light shown at the last meeting, the latter Company had reduced their tender to £400, which the Council after some hesitation decided to accept.

Charge Against a Meter Inspector.—At the Wellington (Salop) Police Court, on Tuesday last, William Henry Woodfine, a meter inspector, employed by the Wellington Gas Company, was charged with stealing a small bag containing about £3 in money from The Grove, Ketley Brook, the property of Fanny Edith Evans. Inspector Evans explained that accused, in the course of his duties as collector of money from gas-meters, called at the house in question. The handbag was afterwards missed. When spoken to about the matter, accused admitted the theft. He was remanded for a week on bail.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *July* 21.

There is very little movement in the London tar products market, although within the last week there has been rather more inquiry for pitch, and prices are understood to be not less than 60s. per ton net at makers' works. Creosote stands at about 7¾d. per gallon net and naked at works. In other products, there is no change to report.

Tar Products in the Provinces.

July 21.

The average values for gas-works products during last week were: Gas-works coal tar, 42s. to 47s. Pitch, East Coast, 55s. to 57s. 6d. f.o.b. West Coast—Manchester, 50s. to 52s. 6d.; Liverpool, 51s. to 52s. 6d.; Clyde, 52s. to 55s. Benzole 90 p.ct., North, 1s. 5d. to 1s. 6d.; crude 65 p.ct. at 120° C., 1s. to 1s. 1d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 8d. to 1s. 10d. Toluole, naked, North, 1s. 5d. to 1s. 6d., nominal. Coal tar crude naphtha in bulk, North, 7¼d. to 8d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 5d. Heavy naphtha, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, liquid, 6d. to 6½d.; salty, 5½d. to 5¾d.; Scotland, 5¼d. to 5½d. Heavy oils, in bulk, North, 9d. to 9¼d. Carbolic acid, 60 p.ct., 1s. 10d. to 1s. 11d. prompt. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Pontypridd Gas-Works Profit.—The working of the Gas Department of the Pontypridd Urban District Council (under Mr. David Muir, Engineer and Manager), for the year ended March 31, has resulted in a gross profit of £12 142, an increase of £2339 over the previous year, and a net profit of £4024, an increase of £340 over the preceding year.

Want of Public Lighting at Hayes.—While cycling along Hayes Lane (from Hayes to Bromley), Miss Annie Millar, of Bickley, was knocked down by a great branch of an old elm tree, which broke and crashed across the roadway. The branch also struck the back of a passing motor omnibus, and only just missed a Bromley woman and child on the footpath. Residents of Hayes Lane fear further falls from the old elm trees lining the lane, and complain of the absence of road lighting during the summer months. The twenty street lamps between Hayes Lane and Bromley are out of use, despite the narrow pathway with no kerb and the great increase of motor traffic there. Considering the cheapness of the gas-lamp and its great usefulness in country roads full of fast driven traffic, is it wise economy for rural authorities and others to extinguish the whole of the public street lamps during the summer months? Many of the nights during these months are dark, owing to atmospheric conditions.

Richmond's Annual Outing.

A few days ago a large party of employees of the Richmond Gas Stove and Meter Company, Ltd., Warrington, were conveyed from Latchford Lock (which is immediately opposite their Grappenhall Works) to New Brighton for the firm's annual outing. It took two large steamers (one being the "Royal Daffodil," of Zeebrugge Mole fame) to carry the party, which numbered 2000. The whole of the arrangements worked without the slightest mishap; and for this, much credit is due to the organizing committee which was drawn from all departments of the works, and the following officials of the Works Benevolent Fund: President, Mr. J. W. Slack (Managing Director); Vice-President, Mr. A. Slack; Chairman, Mr. C. G. Langford (Works Manager); Vice-Chairman, Mr. W. O'Brien; Hon. Secretary, Mr. J. Fairclough; Treasurer, Mr. T. N. Fielding. On arrival at New Brighton a few happy hours were spent ashore, during which time lunch was served. Following an excellent repast, Mr. J. W. Slack was presented with a case of pipes, and was given a hearty vote of thanks for his help and interest in making the trip a success. Mr. Slack, in the course of his remarks, referred to the happy relations existing at the works between employer and employed, and also commented upon the consistently busy time they had enjoyed during the years of depression which followed the war. It was 28 years since he joined the Company, and he had never regretted doing so; neither did he think any of the employees had regretted associating themselves with Richmond's. It was nearly midnight before the tired but happy gathering returned to Latchford Lock. On July 2, Richmond's London office and showroom staff spent their united annual outing on the Thames, a delightful trip from Windsor to Marlow being embarked upon. Forty-five members of the staff constituted the happy party.

Over-Subscription at Horley.—The recent issue made by Mr. Burt Long (the Secretary) on behalf of the Horley District Gas Company of £5000 of additional "B" capital stock (minimum price, par) was over-subscribed.

Lisburn Gas-Works.—Mr. A. S. Brook, Manager of the Lisburn Gas-Works, and his staff have received the thanks of the Urban District Council on their year's work, as reflected in the report of Mr. C. F. Spencer on the audit of the accounts of the undertaking. This shows that there was on the year's working a gross profit of £4565, an increase of £53 on the previous year—and a net profit of £360.

Lochgelly Gas Company, Ltd.—Provost Walker (the Chairman), moving the adoption of the report and accounts at the recent annual meeting, said the gas made was 66 million c.ft., or nearly 6 millions in excess of the previous year. The sum at the credit of the profit and loss account was £3138, and a dividend at the rate of 7½ p.ct. free of income-tax was declared. In addition, £500 was carried to reserve. He intimated that there was likely to be a reduction in the price of gas at an early date.

GAS REGULATION ACT, 1920.

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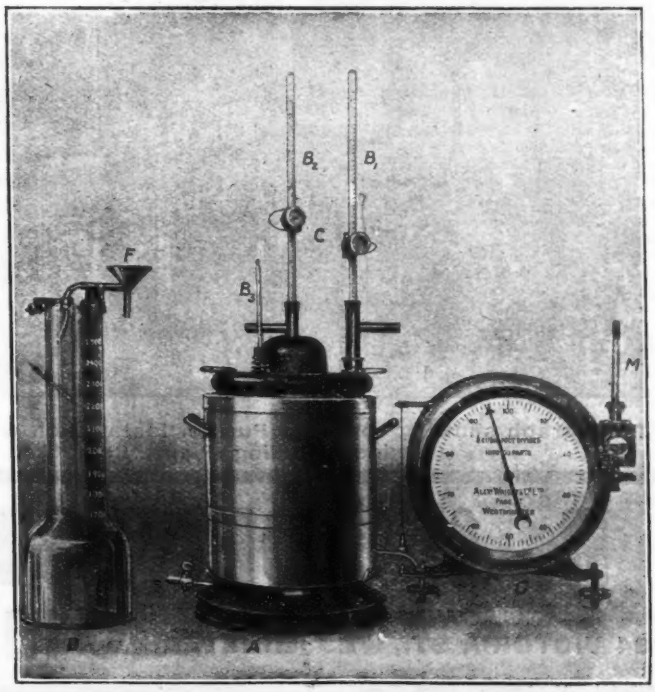


Brave Tar Workers.

At the Oldbury Police Court, on Tuesday of last week, Mr. G. S. Albright (Chairman of the Bench) announced that, arising out of the fatal accident at the Midland Tar Works on April 14, in which great bravery was displayed by two Oldbury men, one of whom lost his life, several awards had been made by the Royal Humane Society and the Carnegie Hero Fund Trust; the recipients being the widow of Mr. George Challis, of Oldbury, and Mr. Arthur E. Hebberts. It will be recalled that, in the course of cleaning out a still at the tar works, a man named Walter Heap was overpowered by fumes and rendered unconscious. Hebberts, who was working near the scene, hearing calls, ran to the still and climbed down a ladder in the hope of rescuing his colleague. Unfortunately, his action was unavailing, and he, too, was rendered unconscious. George Challis, who was working some distance away, ran to the spot, and followed Hebberts into the still. He also was rendered unconscious. Neither Hebberts nor Challis stopped to procure the safety apparatus that was provided at the works. The Royal Humane Society had awarded to the widow of Challis an In Memorian Certificate, and the Carnegie Hero Fund Trust had awarded a framed certificate, a cheque for £20, a pension of 30s. a week to the widow, and 5s. a week for each of her five children. To Hebberts the Royal Humane Society had awarded its bronze medal, and the Carnegie Trust Fund its certificate and a cheque for £25. Mr. Albright said such facts spoke for themselves. These men, without any thought for themselves, ran to the still and tried to rescue their companion. That they were not successful in no way detracted from their bravery and their unhesitating great sacrifice. He then made the presentations.

A New Basis of Coke Prices.—The "Ironmonger" states that a recent conference of the ironmasters and colliery owners of Yorkshire, Derbyshire, and the Midlands decided to base the prices of blast-furnace coke in future upon the ash and moisture content of the fuel. The basis price has been reduced from 24s. per ton to 20s. 6d. at the ovens, for coke having a minimum of 20 p.ct. ash and moisture.

Boston Gas Company.—In moving the adoption of the report of the Directors, at the recent annual meeting of the Boston Gas Light and Coke Company, Alderman T. Kitwood intimated that in November next there would be a further reduction made in the price of gas from 1s. 1d. to 1s. per therm, or about 4½d. per 1000 c.ft. The report and balance-sheet, he pointed out, were of a very satisfactory character.

Droitwich Gas Profit.—The annual report of the gas undertaking of Droitwich was presented to the Town Council last week by the Gas Manager (Mr. H. Wise). The Mayor (Mr. E. Evans), who is Chairman of the Lighting Committee, moving the adoption of the report, congratulated Mr. Wise on the position of the undertaking, and gave figures comparing the year ended March last with that ended March, 1923. The report was adopted.

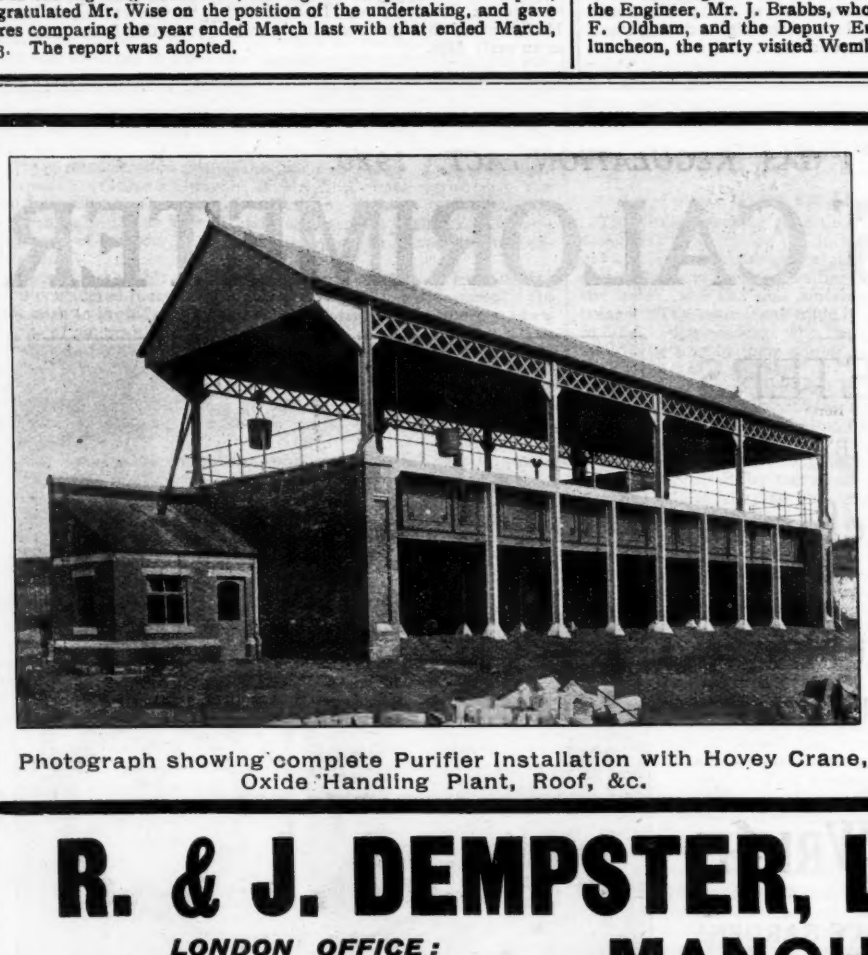
Westwood and Wrights.—A Company has been registered under this title with a capital of £40,000, to acquire the business now carried on at Queen's Cross and elsewhere near Dudley, at Brierley Hill, as Westwood and Wrights, and to carry on the business of engineers, manufacturers of engines, machinery, tools, and mechanical appliances.

Receipts for Wages Paid.—The new Finance Act removes an uncertainty which has for a long time existed among many employers on the question of receipts for wages and salaries, and whether, in law, such receipts (for amounts of £2 and upwards) require to bear the two-penny stamp. Under the Stamp Act, 1891, every acknowledgment of money paid (which is distinct from a colourless memorandum of payment) is technically a receipt, and—when it is for £2 and over—is liable to stamp duty. It has therefore been open for an employer to demand a formal receipt, duly stamped, from his employees. Under the new Finance Act this state of affairs is altered. A clause (exemption 6) in the first schedule to the Stamp Act is to be repealed—a clause which states that all acknowledgments of salary are liable to stamp duty except those from soldiers and sailors. The effect of this will be that in future all acknowledgments of salary, pay, or wages are specially removed from the category of "receipt," and need not bear two-penny stamps. In the case of all other documents which are acknowledgments of money paid, a stamp can be demanded, and refusal to comply renders the recipient of the money liable to a fine of £10.

A deputation appointed by the Looe (Cornwall) Urban District Council to confer with the Directors of the Gas Company relative to a disputed charge for road breaking having failed to agree, a joint conference is to be held between the Council and the Board for the purpose of settling the claim and formulating an agreement to govern future cases.

A controversy has arisen at Burton-on-Trent owing to the Gas and Electricity Committees having decided to send their employees, numbering 220 out of a total of 700 employed by the Corporation, to the British Empire Exhibition, free of cost, and with wages paid for the day. The Council declined to extend the principle to the remainder of the men, as it would cost an extra £550 (almost a halfpenny rate). Indignation is expressed by a section of the ratepayers, and it is probable that protest meetings will be called.

Last Saturday week the employees of the Hyde Gas Company had their annual excursion, and travelled to London. During the drive round the city, prior to luncheon, a halt was made at the Cenotaph, where a wreath was deposited by the Distribution Superintendent, Mr. David Metcalfe. Advantage was taken during the luncheon to present the Organizing Secretary, Mr. H. Rowbotham, with a cigarette case in acknowledgment of his services. The presentation was made by the Engineer, Mr. J. Brabbs, who was supported by the Secretary, Mr. F. Oldham, and the Deputy Engineer, Mr. G. Briggs. After the luncheon, the party visited Wembley.



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STOCK MARKET REPORT.

THOUGH hopes are expressed that the Inter-Allied Conference now sitting in London will ultimately result in an improvement in the financial conditions of Europe, the difficulties to be overcome, as evidenced by the previous conference, are so great that opinion in the City is sceptical of any material results being obtained therefrom. Bank rate discussion has subsided somewhat, doubtless influenced by the weight of opinion expressed by Mr. Reginald M'Kenna.

The success generally attending new issues of gilt-edged securities did not extend to the recent industrial issues; underwriters being left with a large proportion of the Victoria Wine 6½ p.ct. debenture and the South Wales Power 6½ p.ct. preference. Home Government stocks continue firm; but Rails were dull, with few buyers. A little more interest was displayed in the semi-speculative markets. Rubber, Tea, and Brewery shares were prominent; and although prices have appreciated, it is thought that many of the leading shares are still cheap. Brazilian issues have been affected by the revolutionary outbreak in Brazil, but at the end of the week the report that the Federal Authorities had the situation well in hand brought about a rally in this country's securities.

Transactions in the Gas Market were slightly less than usual, doubtless due to the proximity of the dividend distributions. It will be seen that the alterations in the quotations, with one exception, were on the upward grade. Imperial Continental rose again, and are now quoted 165-170.

The following transactions were recorded during the week:

On Monday, Brentford "B" 101, 102 *ex* div., Brighton and Hove 172½, 172½, British 117½, 118½, Commercial 3½ p.ct., 93, Continental Union 7 p.ct. preference 79, European 7½, 7½, Gas Light and Coke 92, 92⅛, 92¼, 92⅜, 92¾, 92⅝, 4 p.ct. preference 81⅛, Imperial Continental 165, 165⅜, 166, Primitiva 6s. 3d., South Barracas, 1⅛d., South Metropolitan, 99¼, 99⅜. Supplementary prices, Aldershot 4 p.ct., debenture 75, 75½, Eastbourne 3½ p.ct. "B" 103½, 104.

On Tuesday, Brentford "B" 103 *ex* div., Commercial 4 p.ct. 94, European 8, 8¼, 8½, Gas Light and Coke 92½, 92¼, 92⅜, 92⅝, 92¾, 92⅞, 93. 3 p.ct. debenture 62, Hastings and St. Leonards, 5 p.ct. converted 92, 92½, Imperial Continental 165¾, 166⅜, 167, 168, Portsea Island "C" 100½, 101, Primitiva 5s. 6d., 5s. 9d., 6s., South Metropolitan 99, 99⅛.

On Wednesday, Brentford "B" 102 *ex* div., Cardiff 7½ p.ct. debenture 104⅜, 105½, Commercial 4 p.ct. 94, Continental Union 29, 7 p.ct. preference 80, European 8¼, 8⅜, 8⅝, 8⅝, 8⅞, Gas Light and Coke 92⅜, 92⅝, 93, 93⅛, 93¼, 3½ p.ct. maximum 64, 4 p.ct. preference 81½, Hastings and St. Leonards 5 p.ct. converted 92½, Imperial Continental 166½, 167, 168, South Metropolitan 99, 99¼, 99⅜, 100, Wandsworth "B" 113 *ex* div., 3 p.ct. debenture 56. Supplementary prices, Wandsworth 4 p.ct. debenture 75.

On Thursday, Brentford "B" 102½, 104 *ex* div., Commercial 4 p.ct. 94, Continental Union 7 p.ct. preference 80, European 8¼, 8⅜, 8⅛, 8⅜, 8⅝, Gas Light and Coke, 92¼, 92⅜, 93½, 93¼, 93⅜, 4 p.ct. preference, 81, 82, Imperial Continental 166, 166½, 166¼, 166⅜, 167, Plymouth and Stonehouse 113, Primitiva 5s. 9d. 4 p.ct. (River Plate) debenture 56½, South Metropolitan 99¼, 99⅜, 100.

On Friday, Bombay 5⅛, Brentford "B" 104 *ex* div., Cape Town 4½ p.ct. preference 6⅞, Commercial 3½ p.ct. 92½, 3 p.ct. debenture 57½, Gas Light and Coke 92¼, 92½, 93, 93¼, Imperial Continental 167, Montevideo 56¾, Plymouth and Stonehouse 112½, 113, Primitiva 5s. 9d., 4 p.ct. debenture 73, 4 p.ct. (River Plate) debenture 57, South Suburban 5 p.ct. 104½, 5 p.ct. debenture 96. Supplementary prices, British, Norwich, 3½ p.ct. debentures 63.

Money was plentiful in Lombard Street on Friday. The general rate for loans was 2½ p.ct., while 2 p.ct. was the lowest rate at which balances were obtainable at the end of the day. The Treasury Bill average rate was again higher—viz., £3 10s. 9·29d. p.ct.

In the Foreign Exchange Market rates were fairly steady. There was a further improvement in the value of the dollar-sterling on the week; the closing price being 4.37 as compared with 4.35½, and is the highest rate for the last two months. French francs continued weak; the closing quotations being 85.65. The Brussels rate was 96. On the reassuring news from Brazil, milreis recovered sharply and closed at 5½.

The Silver Market was quiet and uninteresting during the week; the cash price at the close being ⅛d. down at 34 7/16d. per oz.

The Bank rate is 4 p.ct., to which it was raised from 3 p.ct. on July 5, 1923. Bankers' deposit rates are 2 p.ct. The deposit rates of the discount houses are 2 p.ct. at call and 2½ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr	NAME.	Quotations. July 18.	Rise + or Fall − on Week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
131,978	Stk.	Feb. 7	5	5	Aldershot 5 p.c. max. C.	81—81	..	..
235,492	,,	,,	4	4	Do. 4 p.c. Pref.	70—73	..	..
1,551,868	,,	Apr. 3	5½	6	Alliance & Dublin Ord.	63—68	..	..
374,000	,,	July 10	4	4	Do. 4 p.c. Deb.	60—65*	..	..
280,000	5	May 22	8	8	Bombay, Ltd.	5—5⅛	..	5 1/16
100,000	10	Mar. 6	8½	8½	Bournemouth 5 p.c.	12½—13½	..	..
383,110	10	,,	7	7	Do. B 7 p.c..	12—13	..	..
150,000	10	,,	6	6	Do. Pref. 6 p.c..	11—12	..	..
50,000	Stk.	June 26	3	3	Do. 3 p.c. Deb..	54—59	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb..	74—79	..	..
992,045	,,	July 10	6 5/8	6 5/8	Brentford A Con.	100—105*	+2	..
990,500	,,	,,	6⅝	6½	Do. B New	100—101*	+2	101—104
76,000	,,	,,	5	5	Do. 5 p.c. Pref.	87—92*	..	..
306,690	,,	June 12	4	4	Do. 4 p.c. Deb.	75—80	..	..
181,337	,,	,,	—	6	Do. 6 p.c. Rich. Red. Deb.	100—105	..	..
214,740	,,	Mar. 6	11	11½	Brighton & Hove Orig.	*170—175	..	172½—172½
244,200	,,	,,	8	8½	Do. A Ord.	125—128	..	..
1,387,500	,,	Feb. 21	5	5	Bristol 5 p.c. max.	92—93a	..	..
855,000	,,	Mar. 20	—	7	British Ord.	117—122	..	117½—118½
100,000	,,	June 26	7	7	Do. 7 p.c. Pref.	118—123	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	72—77	..	..
100,000	10	May 22	6	8	Cape Town, Ltd.	6½—7½	..	..
100,000	10	Apr. 24	4½	4½	Do. 4½ p.c. Pref.	6—7	..	6 7/8
150,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb.	7—76	..	..
626,860	,,	Feb. 21	6	6	Cardiff Con. Ord.	99—102	..	..
237,860	,,	June 26	7½	7½	Do. 7½ p.c. Red. Deb.	103—106	..	104½—105½
137,150	,,	Mar. 6	5	6½	Chester 5 p.c. Ord.	88—93b	..	..
1,313,280	,,	,,	6	6	Commercial 4 p.c. Cap.	90—95	..	94
560,000	,,	,,	6	6	Do. 3½ p.c. Cap.	90—95	..	92½—93
475,000	,,	June 12	3	3	Do. 3 p.c. Deb.	56—59	..	57½
800,000	,,	14 Jan. 15	—	—	Continental Union, Ltd.	27—32	..	29
200,000	,,	June 12	7	7	Do. 7 p.c. Pref.	77—82	+2	79 80
660,000	,,	Mar. 6	6½	6½	Croydon sliding scale	101—104	..	..
284,975	,,	,,	5	5	Do. max. div.	84—87	..	..
492,270	,,	Feb. 21	3	4½	Derby Con.	108—110c	..	..
55,000	,,	July 10	4	4	Do. Deb.	74—76*c	..	..
209,000	,,	Apr. 3	5	5	East Hull 5 p.c. max.	..	..	..
1,002,180	10	Jan. 24	5	2	European, Ltd.	8—9	+1	7½—8 1/16
16,503,045	Stk.	Feb. 7	5½	5½	Gas Light & Coke 4 p.c. Ord.	92—94	+1	92—93⅛
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	62—65	..	64
4,062,235	,,	,,	4	4	Do. 4 p.c. Con. Pref.	80—83	..	81—82
4,761,930	,,	June 12	3	3	Do. 3 p.c. Con. Deb.	61—64	..	62
130,000	,,	—	10	10	Do. 10 p.c. Bonds	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Mar. 20	6½	6½	Hastings & St. L. 5 p.c. Conv.	91—96	..	92—92½
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	76—81	..	..
70,000	10	May 8	10	10	Hongkong & China, Ltd.	16—17	..	..
86,600	Stk.	Mar. 6	9½	10	Hornsey 7 p.c.	143—148	..	..
1,976,000	,,	May 22	10	30	Imperial Continental Cap.	165—170	+3	165—168
263,950	,,	Feb. 7	3½	3½	Do. 3½ p.c. Red. Deb.	69—72	..	..
235,242	,,	Mar. 6	6½	6½	Lea Bridge 5 p.c. Ord.	9"—102	..	..
2,127,340	,,	Feb. 21	5½	5½	Liverpool 5 p.c. Ord.	90½—91½b	—1	91
600,000	,,	Mar. 20	7	7	Do. 7 p.c. Red. Pref.	103—106b	..	..
165,736	,,	Feb. 21	9	8	Maidstone 5 p.c. Cap.	124—129	..	..
63,480	,,	June 26	3	3	Do. 3 p.c. Deb.	53—58	..	..
75,000	3	,,	5	7	Malta & Mediterranean	3½—3½	..	..
541,920	Stk.	June 12	4	4	Montevideo, Ltd.	52—57	..	56½
1,875,892	,,	Mar. 6	4¾	5½	Newcastle & Gateshead Con.	85½—86½d	..	..
250,166	,,	,,	4	4	Do. 4 p.c. Pref.	75—77d	..	..
529,705	,,	June 26	3½	3½	Do. 3½ p.c. Deb.	70—72d	..	..
15,000	10	Mar. 6	11	11	North Middlesex 10 p.c.	16—17	..	..
75,940	10	,,	7 7/16	7 7/16	Do. 7 p.c.	11½—12	+½	..
300,000	Stk.	May 8	9	7	Oriental, Ltd.	98—101	..	..
138,120	,,	June 26	7¼	7½	Plym'th & Ston'house 5 p.c.	112—117	..	112½—113
60,000	50	Mar. 6	13	13	Portsea Island B	102—105	..	..
100,000	50	,,	12	12	Do. C	98—103	..	100½—101
2,289,909	1	—	—	—	Primitiva Ord.	½—⅝	..	5 6—6/3
341,400	100	June 2	4	4	Do. 4 p.c. Red. Deb.	69—74	..	73
600,000	Stk.	Jan. 24	4	4	Do. 4 p.c. Red. Deb. 1911	54—57	..	..
820,335	,,	June 26	4	4	Do. B. Aires 4 p.c. Rd. Db.	54—57	..	..
321,670	,,	,,	4	4	Do. R'r F'te 4 p.c. Rd. Db.	54—57	..	56½—57
150,000	10	Mar. 20	6	6	San Paulo 6 p.c. Pref.	6½—7½	..	..
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	40—42	..	..
270,000	Stk.	Mar. 20	5	5 5/8 4	Sheffield A	99—101e	..	..
419,968	,,	,,	5	5 5/8 4	Do. B	99—101e	..	..
1,047,000	,,	,,	5	5 5/8 4	Do. C	99—101e	..	..
90,000	10	June 12	6	8	South African	7—9	..	..
6,609,805	Stk.	Feb 21	5	6½	South Met. Ord.	98½—100½	..	99—100
102,580	,,	July 10	5	5	Do. Red Pref.	96—c8*	..	..
1,895,445	,,	,,	3	3	Do. 3 p.c. Deb.	58—61*	..	..
734,000	,,	Mar. 6	6½	6½	Do. 6½ p.c. Red. Deb.	103—105	..	..
91,500	,,	,,	8½	8½	South Shields Con.	136—138d	..	..
1,087,795	,,	Feb. 21	6	6½	South Suburban Ord. 5 p.c.	101—106	..	104½
368,837	,,	June 26	5	5	Do. 5 p.c. Deb.	93—98	..	96
647,740	,,	May 8	6	5	South'mpt'n Ord. 5 p.c. max.	85—88	..	..
121,275	,,	June 26	4	4	Do. 4 p.c. Deb.	73—78	..	..
250,000	,,	Mar. 6	7	7	Swansea 7 p.c. Red. Pref.	104—106	..	..
200,000	,,	June 26	6½	6½	Do. 6½ p.c. Red. Deb.	102—104	..	..
120,000	,,	Feb. 21	8	8	Tottenham District A 5 p.c.	119—124	..	..
382,275	,,	,,	6½	6½	Do. B 3½ p.c.	101—104	..	..
181,255	,,	June 12	4	4	Do. 4 p.c. Deb.	76—80	..	..
258,251	,,	Mar. 20	5	7/14/4	Tynemouth Con. and New Wandsworth, Wimbledon, and Epsom—	87—89d	..	..
30,000	,,	July 10	9½	9½	Wandsworth A 5 p.c.	132—137*	..	..
255,636	,,	,,	7⅝	7½	Do. B 3½ p.c.	110—115*	..	113
108,775	,,	,,	6/7/9	6/9/6	Do. C	96—101*	..	..
240,165	,,	,,	6/7/9	6/9/6	New Ordinary	..	..	..
352,000	,,	,,	7½	7½	Wimbledon 5 p.c.	108—113*	..	..
98,000	,,	,,	7½	7½	Epsom 5 p.c.	115—120*	..	..
88,426	,,	June 26	3	3	3 p.c. Deb.	55—60	..	56

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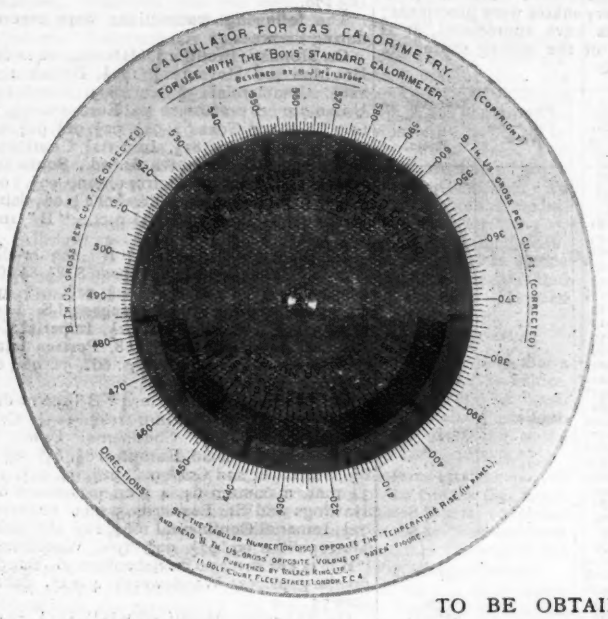
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